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The Making of Russian Toys.

BY R. S. TOWNSEND.

FIG. 1.

FIG. 2.

IT is only when we get off the track of modern civilisation that we realise how many of the best things in life that civilisation destroys. Nowhere is this more true than in the land of toys. Machine-made civilisation has swept through this fairyland like a pestilence, almost completely wiping it out, and it is only in out-of-the-way corners and distant provinces, so to speak, which have so far escaped the plague, that you find any real toys left.

In a London toy shop you see plenty of ingenious—often fiendishly ingenious—mechanical contrivances; but the only real toys to be discovered are those which have crept in, by stealth almost, from the out-of-the-way places of the earth.

Even dolls, which have been the time-honoured companions of children since mankind gave up walking on all fours, are ceasing to be a joy and a pleasure. They possess the distinction of being machine-made perfections of waxwork, but they are not what children want. They are too mechanical, too perfect—in a word, too soulless.

Instead of these inhuman perfections, many, if not most, children prefer a bundle of rags tied together, or something equally simple, which possesses some individuality, and to the childish mind is real and lovable and a part of itself.

Russian toys are genuine products of Fairyland. They are made by the peasants during the long winter evenings, when the snow lies deep round the cottages of the little village, and when the hungry wolf still howls in the forest near by, and sometimes even in the village itself.

Not only do Russian toys possess a remarkable individuality taken as a whole, but those from each province possess their own special delightful characteristics. The northern provinces, the Moscow district, Little Russia, and other divisions of the country, all produce toys quite their own, and the peasants make them now pretty much as they have made them for many centuries.

Art and life have not yet been divorced from one another in Russia, and every peasant, so to speak, is an artist. All the clothes, all the household utensils, almost everything about the people, is beautiful, in spite of extreme poverty. This beauty is part of their lives, and enters unconsciously into everything, and into their toys as much as into anything else.

A Russian toy possesses an individuality and a human interest of its own to a very high degree. The peasant, as he carves a *moujik* out of a block of pine, has before his eyes a mental picture of Ivan Ivanovitch as he last saw him at church, and the wooden figure gradually becomes shaped very much like Ivan; but at the same time the carver puts himself into it, and little recollections of Andrei, Nicolai, and the other peasants, as well as the dead and gone Ivans and Nicolais his father and his father's father used to carve before him: so that the wooden figure becomes not *a* moujik, but *the* moujik, the living type of the Russian peasant carved in the pine wood.

Last winter an exhibition of common toys, ancient and modern, took place in Moscow. It was organised by an artist named N. D. Bertram, with the twofold object of arousing interest in the art of toy-making, which is fast dying out, and to draw a comparison, which no one could miss, between the modern meaningless, machine-manufactured toys of the present day and these crude but living and beautiful things.

There were many different forms of toys at the exhibition—some of them perhaps two or three hundred years old, some made between 1820 and 1860, and from thence up to the present time.

It is most interesting to note how little the toys

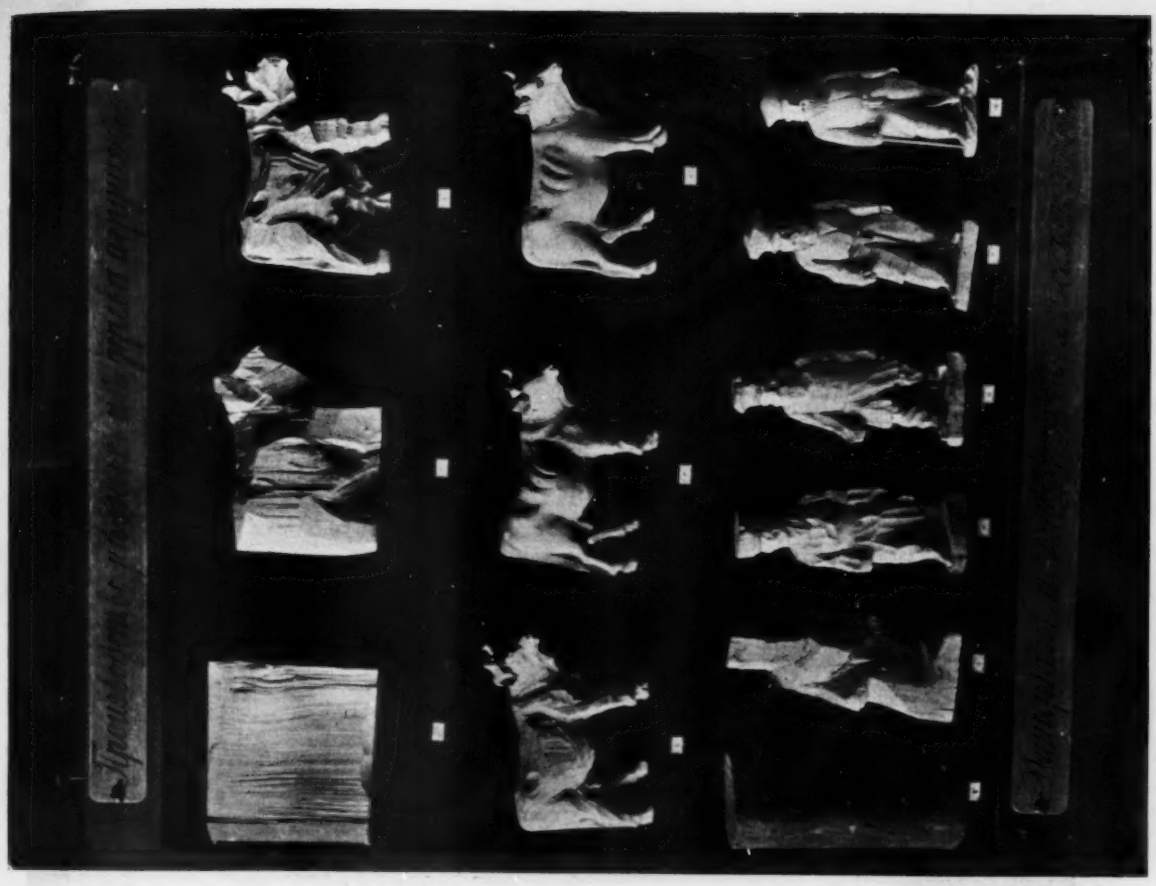


Fig. 3.

Fig. 4

Fig. 5.

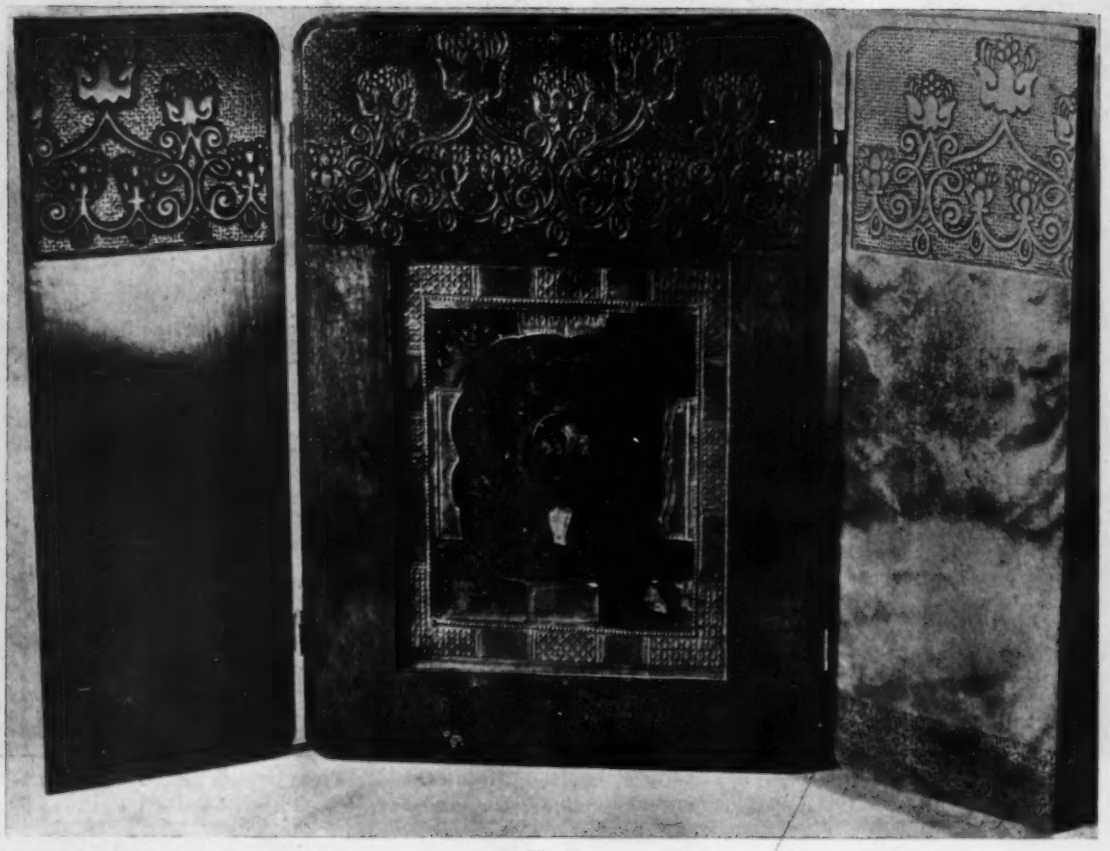


Fig. 6.

have changed. Many toys in use a hundred years ago are still being made almost exactly the same. Some of the carved ones were truly wonderful. There were peasants, bears and various other animals, sledges and troikas, and so on.

One toy which fascinated me very much was a square flat box, on the top of which was represented the outside of a cottage, with benches, a table, and trees in the background. Some little figures were sitting, others standing. You turned a little handle, and the standing figures began to dance an old country dance, the sitting figures to drink out of pots, and the leaves of the trees to rustle. The branches and leaves were attached to the trees by minute springs, and the whole effect was most realistic. This is one of the toys dating back quite a hundred years, and still being made.

Then there were all sorts of wonderful dolls with equally wonderful garments, some costly and others very simple. There were sugar dolls and gingerbread toys, somewhat resembling the figures made of gingerbread which were to be seen at the country fairs in England thirty or forty years ago—from which arose the expression "to take the gilt off the gingerbread."

Next came dolls made of pine cones and dolls made of straw; wonderful figures of men, horses, dogs, camels, and various animals made of paper, and others too numerous to mention. But every toy, old or new, had, so to speak, a soul of its own.

Perhaps the carved toys delighted me most. Among them were carved soldiers and skittle men of Peter the Great's time. The peasants made even Napoleon into toys. One of the crudest and yet perhaps one of the most interesting of the carved toys is a knight on a troika (Fig. 1). This toy, which must be quite three hundred years old, is very conventional, for a troika is a chariot with three horses; and it is very curious how the carver has managed to condense the idea, and by giving three horses' heads to one horse's body, to suggest in such a simple way the essentials of what he had in his mind.

The chariot with the pair of horses (Fig. 2) dates from 1820, and is still made pretty much the same. The whole process of wood-carving is shown in Fig. 3, where the different stages in the evolution of a cow and a peasant are shown from the block of wood to the completed figure. The carving is wonderfully strong and direct, and might serve as a model in our art schools.

I am sorry I was unable to secure photographs of the more delicately carved things; but the platter (Fig. 4), although not strictly belonging to this subject, and the cabinet (Fig. 5) will give some idea of what beautiful carving the peasants can do at their best. The horse in the cabinet (Fig. 5), although very old, is still made with little alteration at the present time. The screen (Fig. 6) is another good example of peasant carved work.

Leaves from a Rural's Log.

II.—A VETERAN OF THE SOIL.

BY W. FRANCIS RANKINE.

OVER against the hill slope where the sombre, towering pines abut upon a width of purple heath, within a garden patch of some considerable size, stands Jim Snelling's cottage. It is a simple ancient structure of a type which is common within our purlieus, bearing testimony to the labours of hands that have been resting these two centuries. Yet simple and ancient as it is, and ensampling an obsolete architecture as it does, it possesses a compelling interest which is mainly derived from a sense of historic association that can never belong to modern buildings.

Jim Snelling's cottage comprises four small low-ceiled rooms, and an annexe which performs indeterminate functions beyond those of bakehouse, granary, meal-store, and beer-cellar. The house itself is built in a frame of rough-hewn, pegged oaken squares, and between these timbers yellow freestones of local origin are masoned. In the mortared seams small fragments of ironstone are arranged like so many nail heads. You never find these pointing decorations in modern buildings, and the very ancient of our village cottages alone bear traces of it. Jim Snelling wonders why the old-time masons resorted to this apparently ornamental finish. He is of the opinion that they had "plenties of time" in those days to make their buildings "pretty like." He thinks it would not pay nowadays. It would not.

The walls are now mellowed by the weathering of time. Orange and yellow lichens radiate in eccentric design over the wind-scarred stones. The dark-red chimney stack—a recent addition of the last hundred years—provides a contrast; and the storm-discoloured thatch, adorned here and there with bird-sown plants, a harmony with the colour scheme of this quaint architectural remnant of the past. The windows are pigmy casements with lead set, diamond lattices which are seldom thrown apart, as is evidenced by the old vine now strayed and far beyond the salving art of the pruning-knife. Within the casement, upon the sill, is an assortment of pot plants, among which an ivy geranium trained indifferently over a hazel twig ladder commands a passing notice.

Old Jim Snelling, the worthy tenant of this old-time cottage, is the grand old man of our parish, the leader of that veteran band now slipping contentedly—and maybe expectantly—to that rest so richly earned in the heat of toil. Every village has these veterans. Jim is rising eighty years, and is still young. He is obsessed with that enviable temperament which refuses to bow to the slowly accumulating burden of the years. Really he is now absolved from enforced labour, and yet it would be his last admission that he had passed into utter helplessness. Pride of labour is the soul of his kind. Seldom a day passes without its toiling execution of some simple task in the garden. Rheumatics—that rack upon which the main of our old countrymen are thrown—have sealed his days.

It is only a few years since Barton, on whose farm Snelling has toiled for more than half a century, persuaded the old man that it would be better for him to take things easy, to potter about at home on wet days instead of raking in the hedge bottoms, as was his custom, regardless of the elements. Gradually, yet unwillingly, the faithful old fellow contracted his sphere of movement, until he finally disappeared from the fields, except to return during the harvest to dispense advice that little pleased the younger men. Often he would appear on hot days at hoeing time to wander harmlessly among the mangolds or turnip rows. Like many another whose evening hours are at hand, old Jim feared to lay aside his harness, to face the days of fretful uselessness; for in these he plainly discerned the mystic, fearful hand of Father Cronos, whose time-glass marks the dreaded hour, and whose scythe severs for ever the last frayed strands.

To those who know these time-spent labourers who uneasily accept the brief, well-deserved leisure of their closing days, a beautiful character of fidelity to honest toil is presented. In pursuing the lowly tasks of their daily toil, they have learned perfectly the lesson of unmurmuring resignation to those things which many of us struggle frantically to control. The caress of long years has smoothed the roughness of disappointment from their memories, and healed the wounds of failure. Life to them has been revealed in all its majestic vastness, shorn of those petty adornments which please the garish eye and tempt the feet of youth. Worn in muscle, weakened in mind, yet strengthened in faith and fortified in soul with the peace that follows the task well accomplished, these wanderers from the vale of toil come eye to eye unflinchingly with the destroyer himself.

Old Jim is such a one, now far advanced along the trail over which there is no retracing of steps. He is nearly eighty, and he thinks that he may live a year or so longer yet, although he adds with a sigh that he will soon be "passing on." Seventy years of his span have been spent in active toil and honest labour, and accordingly constitute a record of great merit—one which an emperor might vaunt with pride. Perhaps in these sentimental days we pin too much admiration upon far-sung deeds. We give too liberally of our praise to advertised virtue. We dispense the laurels without discrimination, and so create heroes unworthy of the crown so lightly won. Thus, perhaps, our standard of greatness is a false one; we lose sight of real merit in the glamour and glare of emotional adulation. Yet in Jim Snelling, and in that venerable company to which time has assigned him, one may readily discern the pure gold of greatness and the real merit of a bravely-battled life. Literature, art, and science know him not; neither does he know them, for he has strayed but little from the conventions of his fathers. He has wended his path simply and patiently through the maze of laboured days, dispensed his toil with honest precision, turned his back upon adversity to face trials anew, shorn life of its hidden fears; and in the end, when his limbs were weary, reluctantly dropped his burden with lingering gaze upon the load to wait the will of time.

Occasion frequently carries me into the precincts of Snelling's cottage, especially in the summer months,

when the carpet of the purple heath blooms swell around the golden gorse banks, and the dun-red pine trunks peep here and there from their sombre green hangings. Along the receding valley one may gaze upon the blue haze of the distant hills, or turn about to take in as much as one's perception will permit the massy verdant grandeur of the chequered uplands. Although Jim's cottage commands these pleasing vistas in all their changing moods year in and year out, I fear the old worthy gives them little heed. Therein lies the prejudice of habit upon one's outlook. For instance, Jim discovers an elusive prettiness in a freshly-turned soil and a baffling beauty in a newly-made fence. He scorns my purple heather sea, because below it he scents a soil yearning to be broken by the plough. For him there is no golden lacery upon the gorse clumps, no sombre richness on the pine slopes, and no ruddy masts with dark-spread sail nor beauty in the far-veiled hills. Yet he graciously admits that it is all mighty pretty, and allows that he has seen worse spots wherein to spend one's days.

To-day, as I wend along the sanded track across the moor, all the colours that elude old Jim are aglow in the heat of a rare summer day. White feathery cloud masses—fine weather banners—slowly traverse the turquoise arch overhead. A cooling breeze ripples the purple sea around the golden gorse banks, and the pine slopes shimmer mirage-like through the heat haze. The lulling hum of insect hordes is the only sound of the moment, for such birds as are not in siesta are joyfully splashing themselves in the streamlet on the low moor. The whole landscape is held spellbound by the majesty of a summer day—a day which even we, the dwellers in Arcady, count as a thing most rare.

While I am still some distance from Jim's cottage, I espy the ancient one seated beneath the honeysuckle canopy of his porch; his gnarled hands are clasped upon his stick, his head is thrown forward, and he gazes with unseeing eyes over the gorgeous sunlit panorama with which, I doubt not, his reverie has nothing in common. The clicking of the latch and the scrooping of the frame, which always accompany the opening of the garden gate, bring his mind to the immediate present from the soothing memories of the past, to which it loves to cling awhile.

I am a doubly welcome visitor this morning, for old Jim has a letter from one of his boys who is now in America, or, as the worthy persists, "Amerrikay." Jim cannot read it, for he was illiterate long before his declining sight precluded any perusal of print or script; and little wonder indeed, for he is a relic of old schoolless days. "I baint no scholard, maister," he sighs; and then adds with a chuckle, as one who has discovered a joke worth recording, "Ye caint be a scholard wi'out no schoolin'." And so he affectionately fingers the filial message which he cannot decipher, and the onlooker is able to discover the utter helplessness of the illiterate. He glances interestedly at the strange stamp by which he knows the letter comes from "furrin parts," and leisurely consigns the document to me, although I know full well the leisure is assumed. In fact, he is anxious to hear what account young Ben has to give of himself and his doings in the land across the water. It is due to say that "Young Ben" is a matured man of forty, who is forging the links of fortune in Manitoba.

His message is a hopeful one. It gives interesting details of colonial ways, alludes to a possible home-coming in the autumn, and incidentally encloses substantial financial assistance. With head bowed the old man listens in grave silence to the son's gossip, and at the close of the reading there follow a discussion and numerous requests for the rereading of some passage he has not grasped or has taken the wrong way about. The old man is surprised that Manitoba is so many thousand miles from our village, although he always had an idea it was a "smart ways away." Finally, the letter is folded, and carefully committed to the thumb-marked envelope; and with the remark that young Ben was "allus a right-down good 'un," the veteran relapses into reverie.

After the execution of some judicious tactics, in which Jim's tabby cat is actively involved, I secure a seat in the porch and light my pipe. It is not, however, my mood to be silent in the presence of my venerable companion, who to me is something of an oracle. He is my medium with the spirit of the past, through whom I may hold a *séance* with dead folk and lost ways. And so I break the silence. I lead inquiries with subtle simplicity. I suppose this and conjecture the other, until old Jim takes pity on my ignorance, and, moved by that feeling of friendship which runs strongly between us, unfolds slowly and disconnectedly his vision of days long gone like a seer of mystic power. And so in truth he is, and it is good for us younger men to glance into the flawed crystal of the past through the eyes of such patriarchs as Jim Snelling. Whatever the subject, one marks throughout the recountal that philosophical attitude of mind which comes to the aged. The mental vision may be blurred at times, yet in the main the long-nursed and oft-repeated themes are truthfully related. The disconnections are, after all, refreshing in themselves, as the wearied mind moves from one path of thought to another at their points of intersection. And even now as I, apparently in the heyday of what we call life, while the summer sun beats down in all its fierce splendour upon the colour of one of earth's fairest pictures, gaze at my aged friend in this old-fashioned flower-scented porch, I hear the faint footfalls of the approaching death angel. His shadow is falling more darkly every day. The light of his presence is being reflected more and more beautifully in the aged face before me; and yet, despite the agony of the passing, it is good to see the sun setting in the untold splendour of the west.

AIR AND HEALTH.

At a time when so much attention is being paid to the health of our pupils, there is a special appropriateness in the issue by Messrs. Methuen and Co. of Mr. R. C. Macfie's *Air and Health* (7s. 6d.). This well-printed and very readable volume contains chapters on The Atmosphere, The Chemical Composition of Pure Air, Respiration, Air Pressure, Temperature of the Air, Humidity and Thermolysis, Humidity and Health, Air and Solar Radiation, Electricity and Radio-activity, Impure Air, Polluted Air, Dust and Germs, Ventilation, Open Windows, Draughts and Colds, The Chest and Breathing, Artificial Atmospheres, Climate, Gases of the Atmosphere, Open-Air Treatment of Consumption, and Open-Air Schools. It will be seen from this list how exhaustively the subject is treated, and teachers are strongly recommended to make a careful study of its pages.

Far and Near.

INTERESTING ITEMS DRAWN FROM VARIOUS SOURCES.

Cosmopolitan Dollies.

OUR friends the Esperantists are working steadily and making sure progress, though it may be slow. Our illustration shows an exhibition of dolls arranged by the Countess Christoph Vitzthum von Echstaedt and other ladies connected with the Dresden Esperanto group in aid of a new building for the Sick Children's Hospital of that city. The exhibition, which was held on November 13, was a great success, a very large number of dollies being sent in, most of which were sold. The Esperanto dolls, sent in by groups in the various countries, were arranged round a centre doll, dressed in Esperanto fancy dress (dress ornamented with stars), and standing near an Esperanto green standard. My readers will readily distinguish in this group a pretty little Scotsman, a typical representative of his race, who was sent to the exhibition by Miss Annie Robb of Edinburgh, and doubtless charmed the hearts of all the visitors to this novel and interesting show. I have before me as I write a copy of the *British Esperantist*, most of which, I confess to my shame, is considerably worse than Greek to me; but I note in one corner a really momentous announcement—namely, that it is hoped to have ready by Easter of the present year a translation into Esperanto of the New Testament. All languages have begun in this way.

What's in a Word?

We cull two extracts from an interesting article with the above title which appears in the current *Book Monthly*:—

"'Quiet' often gives a curious force and strength to a sentence. Quiet strength is a powerful, impressive combination of ideas. Browning uses 'quiet' in one of the unexpected ways—'quiet-coloured eve.' Many, indeed, are the colours that poets have given to the evening. Keats tells of 'green evening,' another poet of 'violet evening,' and another writes of 'blue dusk,' and Milton will have 'twilight gray.'

"There would seem to be certain words that are almost devoid of interest—for instance, 'reminiscence.' If one may say so, it is a singularly resonant musical word, yet it has a deadness indescribable, and lacks all lustre. In calculating one's enjoyment of a word our association of it with its meaning counts for an important factor. The words '*road*,' '*roam*,' '*roan*,' are as alike in sound as words well can be; but of the three, surely it is the word 'roam,' and that one only, that gives a thrill of real pleasure. Its significance is so much wider, bolder, and more poetic than is the case with the other two words, and this widens and dignifies the word itself, like a halo."

To Germanophobes.

Speaking of words, there is a beauty for you! It has been forced out of me with a kind of explosion by a very sensible article by Price Collier in this month's *Scribner*, which is worth reading from start to finish. Here is a taste of its quality:—

"To talk of friendly Japan, or of friendly Germany, is childish. No commercial rival armed to the teeth is friendly.

"Who knew in 1860 that Germany was soon to be the dominant power in Europe? Who knew that she would defeat Austria in 1866? Who dreamed in 1868 that in two years she would crown her emperor at Versailles? Who dreamed in 1888 that she was to be Great Britain's rival on the sea? Certainly no Englishman cried 'Wolf' at the appropriate time. What Englishman to-day explains why Germany smashed Denmark, humiliated Austria, ruined France, defies England on the sea, squeezes Holland commercially, and backs Austria in tearing up a treaty in order to make a grab in the Balkans? What childish nonsense to call this crying 'Wolf!' It is an insult to that great power not to admit that it is a very fine, full-grown wolf—and just now very much on the prowl. That is the fundamental factor to be remembered in any discussion of this much-discussed question. It is not to be wondered at that the nations whose lives are at stake consider the matter more seriously than nations which have only pounds or dollars at stake."

The Trouble-Hunters.

The same magazine contains a well-written paper with the above title, describing the work of the men who keep clear the telegraph line which runs across the American continent. The whole of the paper ought to be read to boys in the upper standards, who will revel in the real deeds of men like Bill Proctor.

> "Last winter the Denver wire chief told him that two men who had tried to 'shoot' some trouble from the farther end of the Steamboat toll line had given it up, and had been found snow-blind and snow-bound in a cabin, burning old bedsteads to keep warm.
>
> "'I'll get it,' said Bill.
>
> "Getting it meant a railroad trip over the divide to the rail-head, then a morning's dickering for a team and sled. No one wanted to make a trip which they considered impossible. But Bill hired a mule from one man, a horse from another, the sled and harness from a third, and persuaded man number four to drive him through the drifts, a plunging twelve miles on his way. With a fifty-four pound coil of wire, two skis, a test-set, and his climbing-irons on his back, Bill pushed ahead on snow-shoes to Whideley's Peak, where he spent the night, and got a guide and trapper to accompany him. That next day's trip was made on skis—eighteen miles over the Rabbit-Ears Range to the trouble—testing back to Denver whenever the line showed above the snow; and for a half-mile at a time twenty-one foot poles would be entirely covered. When he had 'gotten it' and found the wire clear both ways, Bill and his guide, Charley, started back."

Tallies.

Curiosity-hunters may be interested in the following note from an interesting paper in a recent number of *The Lady*:—

> "Before the days of check registers for cash and of many-lined account books and elaborate systems of book-keeping, folk had strange methods of 'keeping accounts.' Quite recently, in a little out-of-the-way Yorkshire village, an inn was discovered where 'notch-sticks' were still supplied to customers. Generally the stick consists of a hazel wand split lengthwise for about five-sixths of its length. The name of the customer is carved upon the thick end of the stick, which piece is kept by the shop-keeper. The other piece of the stick is given to the customer. When anything is bought, the two pieces of stick are put together as they were in the first place, and a notch cut to mark both pieces of wood. In this way a record of transactions is kept which it is utterly impossible to falsify.
>
> "Notch, or tally, sticks belong, however, to a past age. Modern methods have utterly superseded them. To meet with one to-day is an event worthy of note. Probably that little Yorkshire inn has now come to the end of and burnt its last tally-stick. The Scottish peasantry clung to the ancient custom for generations; so, too, did the people of the Continent—Germany, Austria, Italy—who dislike to patronise modern innovations.
>
> "Tally-sticks were in vogue apparently in prehistoric days. Where they originated it would be hard to say; perhaps in France, from whence they derive their common name—that is, French, *taillé*. Roman figures and writing signs became common from the notches cut in tally-sticks. In a similar manner originated the Celtic alphabet, and indirectly modern English letters and figures.
>
> "For years before paper and pens were invented, tally-sticks were in use for the purpose of sending messages, also for calendars. These old stick calendars rarely are to be found nowadays, and when they do turn up, are very eagerly pounced upon by collectors of curiosities."

From Far Japan.

The Editor will probably claim that the following is an echo of his contributors' fulminations on making the curriculum more practical:—

> "Under the existing system of education in Japan boys are turned out of schools and colleges without acquiring any adequate knowledge or training necessary for the pursuit of practical work. On the contrary, their brains are obsessed with ill-digested theories and ideals, making them exceedingly amenable to 'isms' and doctrines which, though highly fascinating, are unwholesome and often harmful."—*Jiji*, Tokio.

If Japan *begins* her popular education on practical lines, she will soon be ahead of her Western ally.

Peacock Chicks.

Here is a Nature note from the *Country Home*, in which there is an interesting illustrated paper on "Peacocks and their Ways":—

> "When the chicks are hatched out they are the most delightful little brown birds imaginable. The colour is a rich, deep brown, and they much resemble young pheasants both in size and in colouring.
>
> "Many people have often laughed at the curious etiquette noticeable in the behaviour of bees towards their queen. But the pea-fowl etiquette in introducing young chicks to their owner is at least as curious. As soon as the chicks are able to walk, the mother marshals them in a procession; and, leading herself, she stalks to the place where she and the others are generally fed. Having formally introduced her brood, she takes them back to the nest, and they are not seen any more for some weeks. The hen will come and be fed, but the chicks are supposed to remain in retreat till they are grown to the size of spring chickens, when they come out and join the rest of the fowls, and learn to fend for themselves."

English Grammar.

The following paragraph from Circular 753, entitled *The Teaching of English in Secondary Schools*, is revolutionary enough.

> "There is no such thing as English grammar in the sense which used to be attached to the term. Grammar is the structure of language reduced to theoretic system, but no system based on the phenomena of any living language can be final. English is not a language the growth of which is ended and the usages of which can therefore be collected and expressed in settled formulæ, but is a living organism in process of constant change. In the past the formal teaching of English grammar was based on Latin grammar. It is now realised that this was a mistake founded on a whole set of misconceptions. The rules governing the use of a highly inflected language like Latin are almost wholly inapplicable to English. Nor is English a language of which the pupils are entirely ignorant before they begin to learn it at school, and which, accordingly, they cannot begin to decipher without the help of grammatical rules."

Yet it was under the auspices of "My Lords" that Standard II. used to be worried with the exact meaning of an abstract noun.

Stone-ground Flour.

Canon H. D. Rawnsley "writes to the papers" on a matter which comes home very closely to all of us:—

> "At many agricultural shows, at many flower shows, the makers of the 'anæmic' flour, as it has been called, offer prizes and supply flour, by way of advertisement, for loaves baked of this or that particular brand; but so far as I know, no prizes are given for bread made of stone-ground flour. Why should not the makers of this flour follow suit?
>
> "Here in Cumberland another very important food-stuff, which in old days contributed to the bone and muscle of our dalesmen, has almost passed away. I allude to the delicious 'Haver' bread, a very thin cake of fine oatmeal, which up to thirty years ago was the staple bread at every farm, and for the storing of which—for only two bakings took place in the year—the oak kists were part of the household furniture. By dint of offering a small prize at agricultural shows in this neighbourhood, an almost lost art is, I hope, going gradually to be recovered, and the 'flat-brod,' which, I believe, came in with the Norse conquerors of Cumberland, may still help to give bone and strength to the Viking children who form the bulk of our shepherds and dale farmers."

I tried the stone-ground flour a short time ago, but cannot say that I enjoyed it.

Back to the Land.

THE EXPERIENCES OF A NOVICE.

"If the day looks kinder gloomy,
An' your chances kinder slim,
If the situation's puzzlin'
An' the prospect's awful grim,
An' perplexities keep pressin'
Till all hope is nearly gone,
Jus' bristle up, an' grit your teeth,
An' keep on keepin' on."

A Rough Time.

A FARMER tells me we have passed the most trying time of the whole year from the agricultural point of view. This is comforting, for the last six weeks of 1910 will not soon be forgotten. The elements combined to do battle. It was a duel to try conclusions as to our endurance, but we are alive still to tell the tale. The wind howled and whistled, breaking this and destroying that; and the rain, too, lent its aid and made the whole countryside more or less a bog.

Our consciences were quite clear; we were only trying to live in a natural instead of an unnatural way, and this attempt on the part of the elements to break our spirits and send us back to the town seemed to us the unkindest cut of all.

It rained incessantly from the middle of November to nearly the end of the year. This district was especially unfortunate, for the rainfall for the first three weeks of December was nearly six inches—an inch being not far short of 150 tons of water to the acre. The market garden, which is on a slope at the bottom end of the meadow, was water-logged, and all prospects of planting fruit trees had to be abandoned. Early in November, as a start, I ordered my gooseberry bushes, thinking there would certainly be some nice open weather then for planting. I also purchased some 350 strawberry roots. The latter, unfortunately, were delivered, but the order for the gooseberries was cancelled. This work will now be relegated to the spring. Meantime I have thickly bedded out the strawberries in the home garden, which is in a much drier condition. During this period there was nothing to cheer one up. The egg supply failed completely, and the green crop in the market garden was hardly ready for selling. I am afraid the soil was not rich enough to carry the two crops—potatoes and greens. However, since then I have started selling the Brussels sprouts, savoys, and other cabbages.

The Great Gale.

The climax to our troubles was reached on Friday, December 16, when we experienced the severest gale in the south of England for a generation. The top of a hill is perhaps hardly a desirable spot in a gale; and I am reminded of the philosophy of a young friend of mine who wisely says that if you live on the top of a hill you get the wind, if at the bottom the water, so he thinks the better spot is half-way between.

The first disaster was in the apiary, and fortunately occurred before dark. Here one of my strongest hives "turned turtle." My readers who are beekeepers will understand what this means. When I reached the spot a few minutes after the accident I found the hive on its side, the roof off and broken, and the frames of comb and bees scattered over the grass. I tenderly lifted the frames and put them back as best I could in the teeth of the gale, repaired the roof, and left them until the storm was over.

The bees which stuck to the combs were mostly saved, but those which were alarmed and took wing were carried away by the gale and were lost. The bees were very naturally angry at being so suddenly disturbed. Their feelings must have been somewhat akin to that of the old lady who, when travelling by train for the first time, was involved in a railway accident, and found herself sitting on the bank. She whereupon made the remark that "they do bring one up sudden like."

The bees' disapproval was shown by their stinging me in as many places as time and the weather permitted. Next evening when I was sitting over the fire a bee quietly walked down inside my coat sleeve.

Before dark I took steps to fortify this and the other hives with lengths of timber. Had I not done so, I am quite sure none of the hives could have weathered the storm.

The Next Morning.

The storm continued with great severity during the night, but abated towards morning. I was very anxious to be about early in order to see what other misfortunes had befallen me. The moon was still shining brightly, being about full at the time, and I could quite easily see that there had been a transformation during the night. The roof of one building was off, and two large fowl houses, similar to the one in the illustration, had been blown over and smashed. The occupants of one, a cock and six hens, were making themselves as comfortable as possible under the ruins; but in the other, occupied by eight fine young cockerels, I found a pure-bred white Wyandotte crushed to death. It is quite wonderful how the others escaped. The whole of the fowl pens had also been more or less severely handled by the gale, and the repairs kept me a good many days

hard at work. The moral of all this is that one must never be surprised at anything, and be prepared at all times to experience the fortunes of war.

The Two Hogs.

The two pigs, which I have now had for four months, are putting on flesh finely. Their tails are curly, and their coats nice and silky. They eat enormously—a bucketful three times a day of good, thick "swill." There seems, however, to be a great diversity of opinion as to their weight. The man who calls from the butcher says ten stone (a stone is eight pounds), but this is, to say the least, disappointing. Personally, I have no idea, so I invite likely country people to give their opinion. One man who has "kept pigs" and should know was shown them yesterday, and to my question as to what he thought of them, replied: "Two very nice hogs. What do 'em weigh? [a grunt, not unlike the pigs]. Well, I should put 'em down at thirty stun

the two. They be solid like, they be. Don't you be for selling them for ten stun. When the butcher has 'em you go and see 'em weighed, and see he don't change 'em for smaller pigs!" Evidently pig dealers have almost as bad a name as horse dealers! However, I do not intend to sell them for another month, as I am told they put on weight quicker from now onwards.

The Rats Again.

I have had the rat-catchers here again this month, and a very exciting time we had. A big old rat got under a small concrete floor, which had two holes about two yards apart. A ferret was put in at one end and came out at the other, and still no rat. The two dogs, one at each hole, were quite desperate, and tore at the concrete with their teeth. Twice the ferret passed through the tunnel without dislodging the rodent. There was, therefore, nothing to do but to break up the floor piece by piece. Presently the distance between the dogs' noses was not more than eighteen inches. The rat-catcher and his assistant were on their knees pulling the concrete up piece by piece. At last one of the dogs got his nose well in, and brought the rat out. We killed three altogether, and each one found a resting-place in the rat-catcher's coat pocket. There are various callings in life, but save me from this one!

The Pullet's First Egg.

My experience of average fowls is that they are sadly lacking in intelligence. They act so often quite stupidly. For instance, they never seem to understand wire netting. If you wish them to leave their pen for additional exercise, they seem to find the exit by accident, and when returning at night endeavour to get in by every means except the open gate. On the other hand, physically defective birds are much tamer, and show a most astonishing amount of intelligence. I had a chicken who was weakly and slow in growing; we named him Billy. He would come out of his pen when called, follow you down the yard, where he was given an extra meal, and would quite willingly go back to his pen and wait for the gate to be opened for him to rejoin his fellows. This happened each day for quite a long time—in fact, until he was ready for the oven. A young pullet has caused us much amusement this week. There was some excuse for her behaviour, for it was a matter of much importance—a first egg. From early morning to late afternoon she paid frequent visits to the nest-box; and at intervals of about half an hour, accompanied by her sire, announced in the usual way that an egg had been laid. The cock took his full share in the uproar, and the scene was irresistibly funny. We got quite tired looking for that egg, but it came at last, and now there is quiet in pen number ten. Doubtless the parent birds felt the importance of the occasion, and wished the event to be noted.

Making a Cold Frame.

I have made a most useful cold frame out of an old brooder, which had become useless owing to a faulty roof. The whole structure was strengthened with strips of wood, and the lights were supplied by two old window sashes picked up in a builder's yard. These sashes were painted and made to fit, and to slide up and down. The lower portion of the frame was creosoted. I am now wondering what is the best use I can put it to. The whole thing cost almost nothing, for I only paid one-and-sixpence each for the window sashes.

N.B.—The Editor will be happy to forward communications intended for the writer of this column if sent to the office of this journal in a stamped envelope.

SIMPLE LESSONS IN NATURE STUDY.

Messrs. Blackie's series of small, cheap, handy, and authoritative handbooks for teachers are now well known among progressive educationists, and Mr. John O'Neill's little volume with the above title will prove useful to thousands of teachers. It is intended for the teacher of general subjects who has no special knowledge of any branch of Nature lore, but only a general, intelligent interest in the "common things that round us lie," and a keen desire to know more about them. These notes, supplemented by careful observation at first-hand, will save many a busy teacher much ineffectual research. The little volume is capably illustrated with diagrams and pictures affording material for black-board sketches.

THE LAUSANNE HOTEL SCHOOL.
(Founded by the Swiss Hotel-keepers' Association.)

SWISS AND FRENCH HOTEL SCHOOLS.

PRACTICAL TRAINING FOR HOTEL-KEEPING.

BY JULIAN GRANDE, F.R.G.S.,
Author of "*The Bernese Oberland in Summer and Winter.*"

(*Continued from page 453.*)

THE practical side of the teaching is considered of such importance that the Principal of the Hotel School informed me that a third of the pupils are henceforth to study in the school only four hours a day, two hours in the morning and two in the afternoon. All the rest of their time they will be engaged in practical work in the various Lausanne hotels. The reason for this modification of the original programme of the school is that the institution does not afford enough opportunity for practical work for the large number of students it has at present.

Needless to say, great importance is attached to personal appearance, and a good address and manners. Students are carefully taught how to receive guests on their arrival, how to handle their luggage, how to show them to their seats at table, and are even instructed in the usages of good society, including the proper way to address persons of distinction. They also learn to give estimates for the furnishing of a hotel in a given style.

The wine-cellar — always a very important and often the most remunerative department of a hotel—claims considerable time; for the students must learn about the best-known and favourite wines of the various countries—how to store, bottle, and clarify them, and also how to buy them.

The exchange and values of foreign coins and paper currency are also taught; and the hotel-school student should also understand something of banking business, especially about drafts, cheques, and letters of credit.

Furthermore, he is taught how a hotel styling itself "first class" ought to be fitted up. Plans of existing hotels are submitted to classes, in order that the pupils may examine and criticise them. Comfort before display is always insisted upon. The importance of keeping a hotel well aired and well lighted, especially if it be intended for English visitors, is likewise inculcated. Even such details as the sanitary measures to take in a case of infectious illness in a hotel are explained.

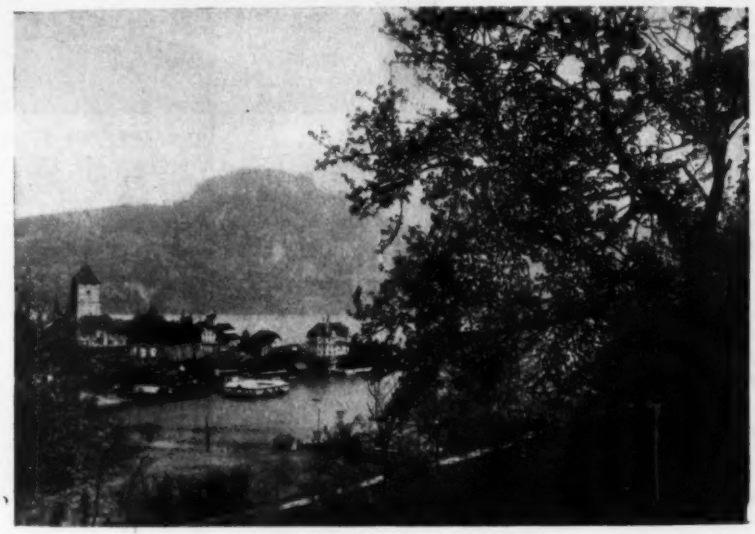
It remains only to add that the Lausanne Hotel School is well situated at Cour Lausanne, in its own extensive gardens. Its importance and usefulness are shown by the fact that it is to be enlarged in time for next season.

THE SPIEZ HOTEL SCHOOL.

Another hotel school or hotel college was established last summer in Spiez, on the Lake of Thun. This school is a private enterprise; and it is international, no preference being given to Swiss subjects. Like the Lausanne School, it insists on every one beginning at the beginning, and learning every detail about the work of a hotel. Its curriculum is very similar to that of the Lausanne establishment, and a three years' course is ordained for pupils with no previous knowledge of hotel work.

Such a school as that in Spiez must either be actually in or near a modern first-class hotel, so that the pupils can have practice in hotel work; and it is the Hotel Belvedere, situated a little way out of the village, which has been selected for its *locale*. It has a very large, remarkably cool kitchen, adjoining which is a "pâtisserie," with an ice-chest. Of course there is a wine-cellar, and everything necessary to a modern hotel.

What struck me about this school and that at Lausanne is that they are both beautifully situated. At Spiez the students' accommodation is in some ways better than in some of our universities and colleges. Moreover, the situation of Spiez is delightful, overlooking the Lake of Thun, with views towards the high Alps in the distance. The students have opportunities of boating, bathing, and fishing, and they are kept in



THE SPIEZ SCHOOL FOR HOTEL STUDENTS.

good form physically by walks and mountain excursions.

The pupils are all young men, though women can also take the course of lessons. There are no English among them, but there are, besides, Swiss, Austrians, French, and even a young Argentine. There are half-yearly examinations, which are supervised by some of the best Swiss hotel-keepers; and at the end of the course, or whenever the student is considered proficient in knowledge of hotel-keeping, diplomas are issued to him, as in the case of the Lausanne School.

The subjects taught at Spiez are practically the same as those taught at Lausanne; but at Spiez there are optional courses in shorthand, typewriting, and special handwriting (Schönschrift), and instruction is also given in the management of balls and entertainments.

Much stress is laid upon the cooking classes, in which not more than a dozen pupils can take part at once. As the director of the school admitted, a person might be an excellent hotelier and have no aptitude for cooking; but he must understand the management of the kitchen department of his hotel if he is to make the highest profits and give satisfaction to his guests.

It was very interesting to hear the chef (in white cap and white drill coat), teaching a class how to draw up luncheon and dinner menus for so many people at a certain price. The pupils must draw up the menus so as to ensure a reasonable profit, and they must also always draw them up having regard to the season of the year. For instance, they must not include blackcock in their June bill of fare.

The chef, though not in the orthodox cap and gown, was in every other respect just like any other college professor. The class was, of course, conducted in German. The chef put the following problem before his pupils: If you have to serve 30 people with a luncheon at 3 francs a head, what can you afford to give them for that price so as to clear a reasonable profit? What ought to come first on the menu?

"Remember," he added, "that it is a luncheon and not a dinner menu, and it must not be entirely composed of light-coloured dishes, nor entirely of dark-coloured ones, but of a judicious mixture of both, as this makes a much better impression on 'die Herrschaften.'"

A pupil then suggested that the luncheon should begin with "hors d'œuvres variés."

The chef accepted this as a good suggestion, and asked what this dish would cost for 30 people. After some discussion it was decided that the cost could be covered by 15 francs. The rest of the menu was drawn up as follows:—

Suprême de volaille au riz. (Cost, 18.70 francs.)
Chateaubriand grillé.
Pommes frites. } (Cost, 17.35 francs.)
Salade laitue.
Meringues Chantilly. (Cost, 15 francs.)

Then the chef asked, "How much be allowed for 'die Unkosten?'" (that is, for service, firing, light, and wear and tear).

The answer was 50 centimes per person. Fifty centimes multiplied by 30 is 15 francs, and an addition sum on the blackboard showed that the total out of pocket expenses for this luncheon had amounted to 81.05 francs. The receipts, allowing nothing for wines or liqueurs, would amount to 90 francs, and the profits, therefore, on the luncheon alone to 8.95 francs. It will be seen from this that the profits in hotels on the meals are not calculated on an extravagant scale.

I heard quite a series of menus being drawn up, and the minutest details of their cost discussed, even to that of the bread needed for stuffing pigeons. I was struck by the very few English dishes which were mentioned. In one case, when a too expensive menu had been drawn up, it was suggested that "die Herrschaften" would perhaps not object to "ein englischer Pouding" being served them instead of the more costly ice originally suggested. The other British dishes mentioned were Scotch broth and Irish stew.

THE LATEST SWISS HOTEL SCHOOL.

Some of the pupils were reproved by the chef for allowing too large quantities of meat, fish, or vegetables, others for allowing too small quantities; but as a general rule they erred on the side of allowing too little of everything.

To me the chefs' classes were naturally much the most interesting of all. I never before realised how many matters have to be taken into consideration in drawing up hotel menus. I also saw the English classes going on; but one of these was for beginners, who hardly understood what was said to them, and the other for older pupils, who still could scarcely read English so that I could follow it. I was told, however, that English is to be taught by an English person, which would certainly be an improvement. Probably a Swiss finds it more difficult to learn English than would any other foreigner. Of course, many Swiss speak English well up to a certain point; but they rarely seem to

have any command of it, can seldom speak it idiomatically, and there are certain mistakes which they seem wholly unable to avoid. Nevertheless, the need for a knowledge of the three leading languages —English, French, and German—and the advisability of knowing Italian as well, is always insisted on by hotel schools.

The fees of the International Hotel School at Spiez seem very low to English notions, though they are higher than those of the Lausanne School. For full board and lodging, together with tuition, from £80 is charged for the eight months' school year. Extra charges are made for cooking lessons, teaching German to foreigners, and certain special subjects.

The hours of work are long, as any one knowing Swiss habits would expect, but there is a break of two and a half hours at midday. The first lesson begins in summer at 6.30 a.m., and work continues, with intervals, till late in the afternoon.

The New Paris Hotel School.

France has also recognised the importance of special training for the work of hotel-keeping, and so recently as last October an "École d'Industrie Hôtelière" was opened in the Rue Jean-Jacques-Rousseau. This school was founded by the French and Parisian Hotel-keepers' Association, its object being to encourage, or, in the words of its founder, to "spur on" (*aiguiller*) young Frenchmen to embrace the calling of a hotel-keeper. Nevertheless, foreigners are not excluded, and what is really wonderful is that among the first pupils was a young Englishman. From the very nature of hotel schools the classes cannot be large, and the total number of pupils at the Paris school has been limited to twenty-five.

The French Hotel-keepers' Association have not only adopted in the main a curriculum similar to that of the Swiss Hotel-keepers' Association, but they maintain that a good hotel-keeper must not rest content with understanding merely matters relating to hotel-keeping (such as buying provisions and wines, book-keeping, etc.), but he ought also to be something of an engineer, something of an architect, something of an electrician, and very much of a linguist.

Pupils at this school also are not admitted under sixteen, but there is no upper age limit. The course is for two years. The first year's work lasts eight months, and is devoted to the technical studies necessary to a hotel-keeper. The second year the pupil does nothing but practical work in some hotel belonging to the Association of French Hotel-keepers, the proprietor or manager of the hotel being responsible for teaching him.

In the Paris school there are both boarders and day scholars. The fees for a resident student during the first year are nearly £7 a month for a term of eight months—that is, if he is the son of a member of the French Hotel-keepers' Association. For French subjects, not sons of members of this association, the fees are nearly £8 a month; for foreigners, £1 a month higher still. During the whole of the second year, for which no fees are paid, pupils give their services, and receive in return instruction in hotel work, and board and lodging.

In my opinion, the French school has many improvements in its syllabus. For example, it enters into the question of advertising—a subject in these days of much importance to all hotel-keepers. Naturally a great deal is taught about French health resorts and the French railways; but the opinion of leading Swiss hotel-keepers is that a period of two years' study is not enough. The French, however, would probably reply that they are not so slow to learn as the Swiss.

The creation of the Paris Hotel School was suggested by M. Cruppi, formerly French Minister of Commerce.

After having stayed in all sorts of hotels in Europe, Egypt, and even Palestine and Syria, I am convinced that much of the business of hotel-keeping can be learned only by practice and experience. Yet after visiting these hotel schools, I see plainly that they afford a very good preparation for the hotel business. Recently an effort was made in London to train British waiters at an old-established hotel. But, after all, waiting is but one branch of hotel work, and so far no school has been established in this country for training for the work of keeping a hotel. For an occupation, however, with prospects no wider than those of waiting, the best class of young men is not likely to come forward.

The question lastly arises: How far can a good hotel-keeper be made or trained at all? Is he, like the poet, born and not made? The answer probably is that any man with a clear head, a grip of finance, and quick judgment of people could, given enough perseverance, become a good hotel-keeper. I do not think there is any special hotel-keeping instinct. But it is very clear that many qualities of a somewhat high order are required really to succeed in keeping a large hotel, especially one with an international clientèle.

As world travel becomes quicker and easier, the business of hotel-keeping is likely to have a greater element of chance in it, and to require more and not less skill and knowledge. Hotel schools will probably always exist, just as there will always be schools of journalism; but the hotel school can help the intending hotelier more than the school of journalism can help the intending journalist.

Finally, why does not a calling requiring so much ability as is necessary for the management of a large first-class hotel oftener attract capable business men in this country? The answer, it seems to me, is to be sought in the complex and peculiar conditions of English social life, and into that highly controversial matter I cannot enter here.

THE ZOO AT HOME.

Messrs. A. and C. Black send us a charming volume which is described as *A Nature Book for Boys and Girls*, and which contains no less than fifty-five illustrations, thirty-one of which are in colour, and very beautifully reproduced. The letterpress is very simply written, and arranged in an orderly manner, dealing in turn with the home and foreign fauna. We have tried the book at home with excellent results, and think it would be equally well appreciated in the schoolroom.

A MANUAL OF DRAWING.

An interesting volume which had its genesis at Cape Town has just been issued by Messrs. Longmans. It deals with the drawing of the first four standards in an up-to-date and highly suggestive manner, and teachers in all parts of the empire will be able to glean many valuable hints from its well-illustrated pages.

Adenoids and Mouth-Breathing.

BY H. EMLYN JONES, M.R.C.S. (ENG.), L.R.C.P. (LOND.).

CONSIDERING that medical inspection of school children has been in vogue throughout the country for two or three years, it is surprising how ignorant the majority of even intelligent persons are of the ill effects due to mouth-breathing, with or without nasal obstruction. That nose-breathing has advantages is fairly well recognised, though many still regard it as a fad, and the impression is that for some reason it is healthier to breathe through the nose, but that it has any effect upon a child's intelligence few seem to realise.

I am inclined to think that instruction as to the uses of the pocket-handkerchief and teaching suitable breathing exercises would do more good, and with the minimum expenditure of time and money, than any

FIG. 1.—A bad case of "adenoids," though somewhat unusual, owing to the large size of the external orifices of the nose.

N.B.—This lad's mental power is "dull and backward," being entirely due to the nasal obstruction. He has recently been operated upon with immense benefit, mentally and physically.

other step which can be taken for the child's welfare. Some have even suggested that a good deal of the malnutrition existing among our public elementary school children is in no small measure due to the prevalence of "adenoids" and the practice of mouth-breathing.

Whether this be the case or not (and my own experience causes me strongly to support this view), it is perfectly certain that mouth breathers tend to become dull, stupid, and backward. They become subject to colds and chronic catarrh, which ultimately affect the hearing, and thus increase the stupid appearance of the child, and often explain its listlessness and inattentiveness. When a large percentage of such children attend any one school—and in some of my own districts over 25 per cent. of the children are of this variety—teaching is rendered more difficult, progress is impeded, and the more intelligent also have to suffer.

This nasal obstruction may be complete or partial, periodical or constant. If complete, the child breathes entirely through the mouth, and the condition is usually obvious. Partial obstruction is often overlooked unless the child be closely observed, when it may be found that he breathes through the mouth once in every four or five respirations, or that the obstruction seems to be in one nostril only, that sometimes one seems blocked, sometimes the other, but never both at the same time; or there is obstruction only at night or under certain conditions, such as during exercise or drill, emotional excitement, etc.

When such chronic obstruction occurs at an early age many deleterious effects quickly follow, not only on the neighbouring parts, but also on the general well-being and on the development and growth of the whole body. Hence it is of the greatest importance that teachers should be thoroughly familiar with these early effects, and able to recognise the more common symptoms.

"Adenoids" may be defined as "an undue growth of the lymphoid tissue which is normally present in the post-nasal space." The condition may be occasionally observed in infants a few months old, but more commonly comes under notice between the third and eighteenth year of life. Heredity certainly plays an important part in its causation, for frequently several members of a family are affected, and the growths are frequently found along with enlarged tonsils, enlarged glands of the neck, and thickening of the lining membrane of the nose.

Though not uncommonly free from any such association, the presence of enlarged tonsils practically always indicates some degree of adenoid tissue. Recently I have been struck with the large number of children affected in those low-lying districts in which the soil is marshy or clayey; and though doubtless rheumatism, soil elevation, and heredity all act as predisposing causes, the vast majority are directly induced by mouth breathing, a habit undoubtedly often produced by the constant use of the "dummy" in infants. The open mouth allows "germ-ridden" air to enter, and these germs, attacking the lymphoid tissue at the back of the nose, cause the latter to become inflamed, resulting in its overgrowth, with the production of adenoids.

From the teacher's point of view, the symptoms resulting from the presence of adenoids may be divided as follows:—

I. DIRECT EFFECTS.

1. *Snoring.*—This may occur during waking hours, and, if the obstruction be marked, is a constant feature during sleep. It is due in children to the passage of air through the narrowed nostrils, for it has been ascertained that, when a child is asleep and snoring vigorously with open mouth, the greater part of the respiratory air is passing in and out of the nose. This can be

easily verified by holding a few strands of cotton wool in front of the child's nose and mouth during sleep. In these children there is a marked diminution in the amount of air entering the chest during sleep, and consequently the blood thereby suffers.

If a case of marked nasal obstruction be carefully observed whilst asleep, it will be noticed that air enters the chest only once out of every four or five respiratory movements. The results of this deficient oxygenation of the blood are marked. Sleep is not restorative, and the child awakes in the morning tired and complaining of headache, with the well-known dark look round the eyes. Frequently sleep is disturbed by bad dreams, and the child wakes suddenly up shouting and screaming, or is so frightened that it is afraid to go to sleep. These "night terrors" are probably often due to this partial suffocation.

2. *Speech*.—This is altered in the way so familiar as the result of a cold. The nasal resonance is partially cut off, and consequently it is difficult or impossible to pronounce *m*, *n*, and *ng* accurately. In addition there is a flat tone about all vocal sounds, due to the diminished resonance space. The voice is often inaccurately said to have a "nasal" quality, but in reality this is exactly what it lacks.

3. *Difficulty in breathing through and in blowing the nose, resulting in loss of the nasal functions and its effect on nose and neighbouring organs.* — The inability to blow the nose properly produces a chronic catarrh, and leads to the well-known repeated "colds in the head." The consequent accumulation of secretion irritates the lining membrane of the nose, and, lowering its vitality by producing congestion, frequently causes nose-bleeding and infection of the nose with microbes. These frequent catarrhs indirectly lead to infection in the space behind the nose, and so, by setting up inflammation in that region, to adenoids. Hence it will be seen that a kind of vicious circle is formed—namely, nasal obstruction, accumulation of secretion, inflammation, adenoids.

Direct extension of this process also takes place in the communication between the nose and the ear. It is common knowledge that a "cold in head" produces temporary deafness; hence it can be easily imagined that a similar chronic affection will produce defects of hearing and earache.

4. *Symptoms due to the constantly open mouth*.—The *gaping mouth* with the projecting front teeth only half concealed by the shortened upper lip, the hanging lower jaw, and the consequent obliteration of the folds of expression around the mouth give the child the well-known stupid look not unlike that of certain idiots—a resemblance greatly intensified by the deafness and mental obtuseness. The *shape of the nose* is usually altered, the soft wings at the sides being collapsed, and the external openings generally reduced to mere slits. When adenoids, or any form of chronic nasal obstruction, exist in early life their effects upon the soft and actively developing bones of the face may assume proportions of the utmost importance. *Deficient development* of the upper jaw is often marked and recognisable even at an early age. At the age of six all the temporary teeth have spaces between them—that is, the jaw has outgrown them, and is now ready to receive the larger permanent teeth as they erupt. When adenoids are present this spacing does not occur, the temporary teeth remain closely packed together, there is no room for the permanent set to erupt naturally, and in consequence they become irregular and crowded. These irregularities permit particles of food to collect between the teeth, and predispose to their early decay. The dry state of the gums and mouth caused by mouth-breathing increases this tendency. The palate is higher than normal in children with adenoids, and the longer oral breathing persists in a growing child the higher will it become. There is every reason to believe that the nasal obstruction precedes and causes the facial deformity, for the latter is never congenital, but follows years of mouth-breathing. Moreover, the changes can be arrested if the cause be removed. Another important direct effect of mouth-breathing is the *tendency to bronchitis and lung troubles*, owing undoubtedly to the inspired air being cold and often infected with microbes. The large majority of children presented to me on account of irregularity at school, more especially during the winter months, on account of frequent attacks of bronchitis, are invariably due to the presence of adenoids, accompanied by mouth-breathing.

FIG. 2.—BOYS SUFFERING FROM ADENOIDS.
(Note the "mouth-breathing.")

II. INDIRECT EFFECTS.

1. *Symptoms due to deficient aeration of the blood during sleep*.—Nasal obstruction and the presence of adenoids produces, both in adults and in children, a peculiar group of nervous symptoms, chiefly characterised by the inability to fix the attention or to undertake anything requiring close mental application. There is a considerable degree of stupidity, and the memory may be so impaired that the simplest arithmetical calculations may become impossible. The disposition may be altered, and children may become irritable or morose, fretful, languid, and unwilling to work or play. Nervousness, listlessness, and nervous depression quickly follow. The disturbed rest resulting from the imperfect oxygenation of the blood, combined with the

frequent catarrhs and other evil consequences of mouth-breathing, soon produces most baneful effects upon the general health. Children become stunted, anæmic, and ill developed in growth, and are almost always ailing. The appetite is frequently capricious, owing partly to this indirect effect on the general health, and partly to the discharge associated with the adenoids becoming swallowed, and so affecting the somewhat sensitive lining membrane and glands of the stomach. Occasionally there is actual difficulty in swallowing, owing to the accompanying tonsillar enlargement.

2. *Deformity of the chest walls due to obstructed respiration during sleep.*—The common deformity associated with adenoids is the so-called "pigeon-breast," caused by a flattening of the sides of the chest, combined with a projection of the breastplate or sternum. I have stated above that, although the child sleeps with its mouth open, respiration is chiefly carried out through the obstructed nose, due no doubt to an overpowering instinct for nasal respiration which asserts itself in the sleeping child, combined with the mechanical difficulty that during sleep the tongue falls back in contact with the palate, and so obstructs the passage through the mouth. If the bones are soft—and rickets from malnutrition is a common complication of adenoids—such flattening as I have described will occur with the production of the typical pigeon-breast. These deformities are among the most serious effects of adenoids; for, combined as they are with the general ill-health and frequent catarrhs, they will render the child still further susceptible to chest troubles.

FIG. 3.—A GROUP OF GIRLS WITH ADENOIDS.
Both these girls and the boys in Fig. 2 are dull and extremely backward, but in no case is there actual mental deficiency.

3. *Symptoms of obscure Origin.*—Among the chief of these are asthma, hay-fever, stammering, and the nocturnal incontinence of urine (bed-wetting). Though these affections are in many instances undoubtedly dependent on the presence of adenoids and are cured by the removal of such growths, it must clearly be understood that they all occur also as specific troubles quite independent of nasal obstruction. As I mentioned in my last article on "Nervousness," * they all especially occur in neurotic children. Nevertheless, very many instances are on record of a complete cure being effected on the removal of adenoids in those children suffering from the latter trouble in addition to the neurotic taint. In other words, nervousness and neurotic symptoms are all increased in severity by the presence of adenoids.

* *Practical Teacher*, January 1911.

TREATMENT.

I do not wish it to be understood that in all cases such as I have described should actual removal of the adenoids by operation be undertaken. As a general rule, provided the symptoms are not severe, simpler measures may be first tried. Very often it is found that symptoms are not due merely to the adenoids, but to their producing an excessive secretion of mucus, which becomes dry and causes blocking. If that can be removed, the adenoids of themselves may not be sufficient to cause serious symptoms. It is in these cases that teachers and parents can do much to prevent them coming to operation.

Parents should be instructed to douche each nostril twice daily with a solution of borax (1 drachm to the pint). This should be allowed to run out through the mouth, and acts as a solvent of the mucus, thereby washing out the nasal cavity. This method, combined with appropriate *breathing exercises* both at school and at home, will in many early cases effect a cure. Should this method not improve the child in a month or so, no more time should be wasted, but the patient should be presented for operation without delay.

Regarding the actual method of breathing exercises adopted, may I say it really does not matter, provided the child be taught to breathe *in and out through the nose with the mouth shut.* Those exercises laid down by the Board of Education in the new *Syllabus of Physical Exercises* * are ample, though I usually find that the additional Swedish method of breathing through each nostril separately with the mouth closed is especially useful in the bad cases. But whatever method be adopted, the real secret of the cure lies in the fact that *the exercises be performed thoroughly and often.* Provided this be efficiently carried out, recurrence will *not* take place. With the better and more thorough physical drill and breathing exercises at present in vogue in our public elementary schools, I am confident that cases of adenoids and mouth-breathing will become fewer and fewer, and that as a consequence both the average physical and mental condition of the children will improve in direct proportion.

* *Syllabus of Physical Exercises*, Board of Education.

FOR LANTERN LECTURES.—The Visual Instruction Committee appointed by the Secretary of State for the Colonies has issued the first book of a series of lantern lectures on the Colonies and India, for which a special fund was raised by a committee of ladies presided over by Lady Dudley and under the patronage of Her Majesty the Queen, then Princess of Wales. The present book consists of eight lectures on India, written for the committee by Mr. H. J. Mackinder, and is illustrated by 480 lantern slides.

The slides, together with the book in its form for teaching purposes, may be bought from Messrs. Newton and Co., 3 Fleet Street, E.C., from whom particulars can be obtained on application. A cheap illustrated edition of the book has been published by Messrs. George Philip and Son, 32 Fleet Street, E.C.

Our Art and Handwork Section.

NEEDLECRAFT FOR PRIMARY AND SECONDARY SCHOOLS.

BY ANN MACBETH AND MARGARET SWANSON, INSTRUCTRESSES AT THE GLASGOW SCHOOL OF ART.

WE take now the treatment of velvet, which is the most difficult material to treat with embroidery, owing to the depth of the pile, and the consequent difficulty of marking the pattern and accurate stitching. This demands that the design be cut out first in oiled paper as a stencil, and then marked on the material with Chinese white put on with a rather dry sponge. The patterns for velvet should be very bold and simple and of sober colour, without any small details or intricate curving; and the main outlines should be followed by a line of couching in thick silk, or several strands of thin silk used as one thread, and stitched down with machine silk about seven stitches to the inch. This couched line must be laid as flat as possible, and must not be drawn tight at the cross stitches. The general masses may next be filled in with satin or Oriental stitch in silk, or good effect may be got by continuing the outline couching spiralwise till the whole space inside be filled in. Borders of lines of couching only, in one or more colours, may be quite sufficient decoration, especially on outdoor garments, with a finishing line of French knots or small beads or jewels.

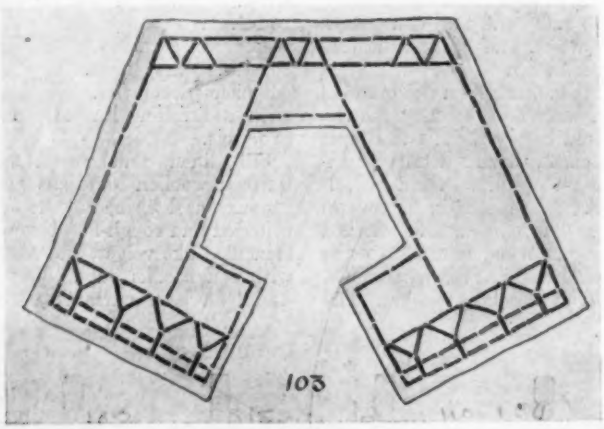
Silk, linen, and cotton and light-coloured smooth finished woollen materials may be marked by carbon tracings, as described in the January number; but dark-coloured and rough-faced woollen textiles require to be stencilled like velvet, and should be sewed with wool or with rough silks only. Very coarse jute canvas is also useful for large curtains or for covering stools, but its

FIG. 114.

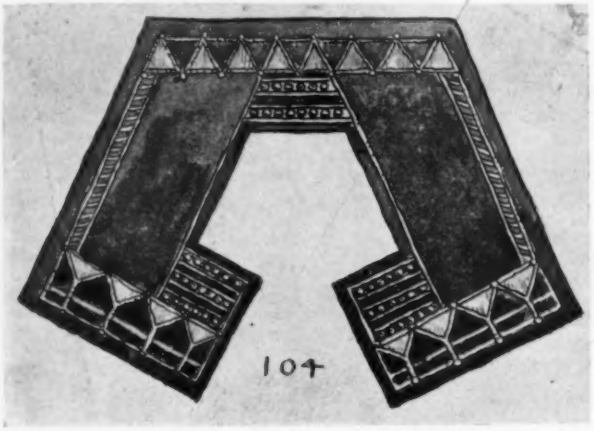
colour is rarely very enduring, and it should be treated with designs of a coarse and barbaric style, sewed in wool or coarse cotton. Even rug wool is not too coarse to be used for couching the outlines on such material as this.

When starting a class of young students in design, it is well to confine their first half-dozen pieces of work to designs done in straight lines *only*, and these may, for convenience and the saving of time, be drawn with a ruler on squared paper. The stitches employed should be limited to one or two or three at most. For instance, the first two designs done might be executed in tacking or running stitches only. This permits of masses filled in with fine darning, and hems may be carried out in the fashion of the first elementary exercise (Diagram 1, in the March number). The next two designs could include top sewing and tacking, and here the teacher might show that satin stitching is merely the top sewing or hemming stitches extended and laid flat and close to each other. Herring-boning likewise develops with closer stitching and slight adjustment into Oriental stitch, and so on. In this way the student will learn the capacity of her stitches in a very satisfactory manner.

After a certain proficiency of handling has been gained in the use of straight lines a pair of compasses can be used, and it will readily be discovered that by a careful arrangement of circles the semblance of floral forms can be arrived at. Next, a simple leaf form may be introduced, still using the straight lines to connect the masses of the design together; but any attempt to portray any naturalistic rendering of plant or any other form should be discouraged as far as possible. You can with a certain ease and facility *paint* a rose, but you cannot without straining your materials to the utmost *sew* such a rose. Nor is it needful to do so. If a picture of a rose is wanted, *paint* it; but you do not want your dresses and household hangings illustrated with pictures; you want them decorated with pattern, and *pattern* and *pictures* are entirely different things. By this means of commencing designing on a geometrical rather than a pictorial basis, the class will give infinitely less labour to the teacher; for the students will be able to think out their patterns for themselves instead of having the teacher, as is mostly the case, to think out the designs for them. And these suggestions do not apply merely to needlework, but are equally applicable to design for every craft. Let the student study from Nature—yes, the more the better—and note and remember all he or she sees.



STENCIL FOR DIAGRAM 104.



You can make pattern out of anything, but do not forget that you can make pattern if you can do no more drawing than is demanded by the legible writing of your name.

By these means the children and the older students also will begin to think for themselves, and will develop more resource of mind than by almost any other means. For this is not merely sewing combined with art; it is the development of the creative genius, which is the healthiest and happiest working faculty we have, and which has been most grievously neglected of late in general education.

There is no greater joy in life than that joy of creating—of making a new thing the exact likeness of which has never been made before—bringing us thereby into closer kinship with the Creator of all things. And this power to create is in us all, though we sometimes do not discover or realise it. Yet we should seek it, for through it do we most rapidly and strongly develop.

This subject of school needlework and its higher and more artistic developments should be a far more important educational factor than it has been of late. It combines so much of mathematics in its training of mind, eye, and hand in the balance and proportion of stitches, of pattern, of form, and of colour and tone; it calls for so much logical common sense in determining the suitable use of material. It can give exercise to the poetry

DIAGRAM 105.

DIAGRAM 107.

DIAGRAM 108.

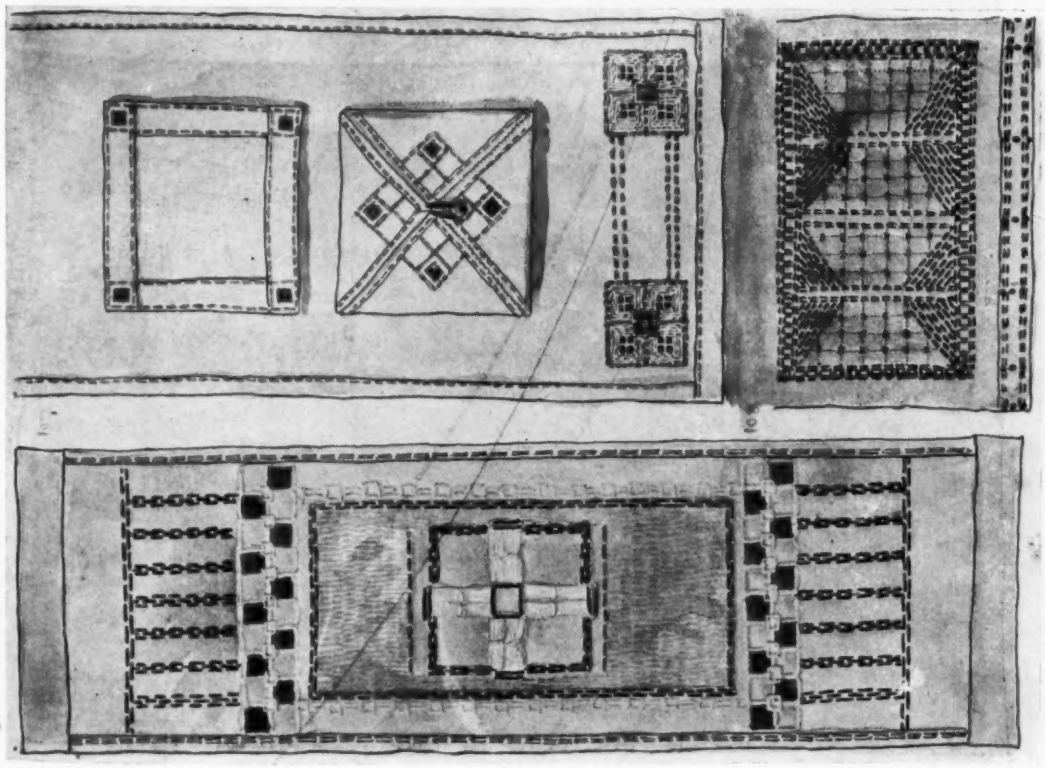
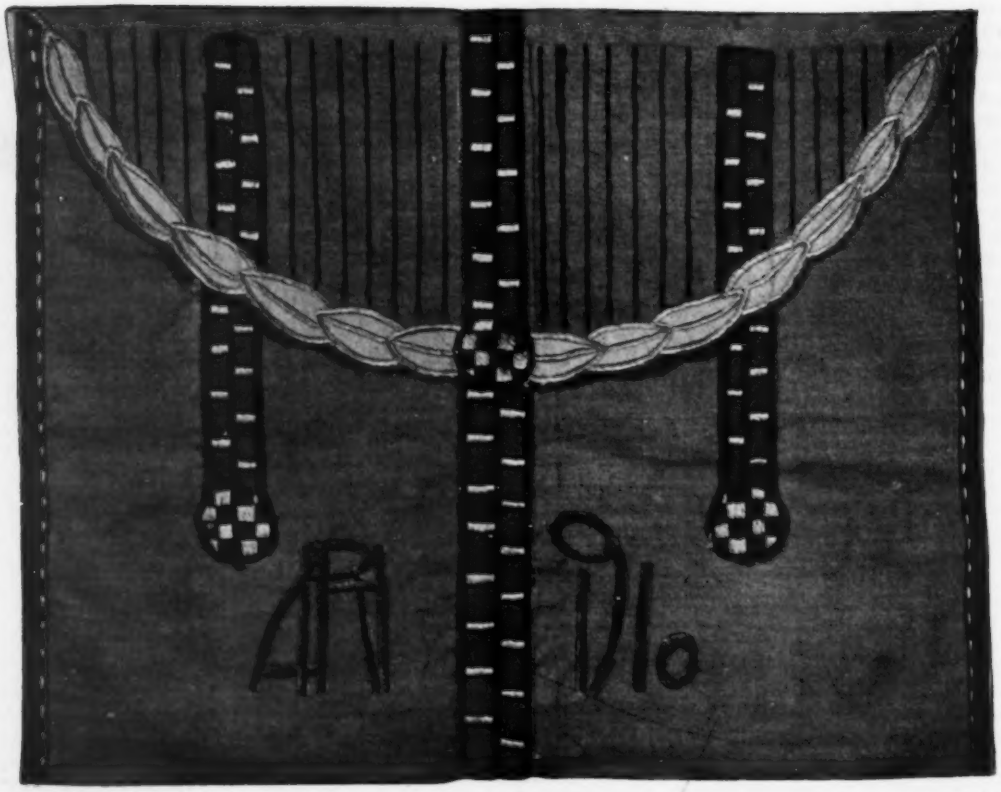
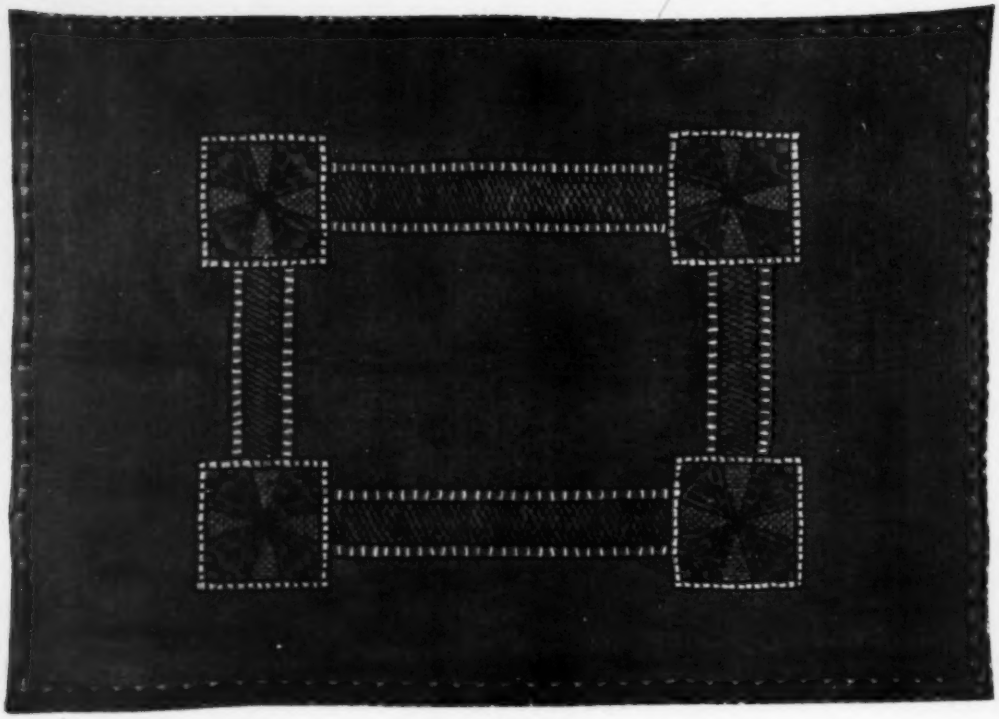


DIAGRAM 106.





Diagrams 112, 113.

of symbolism where design can be made appropriate to the user, or to the use of the work; and it is of far more ultimate use to the average woman than years of mathematical exercise on paper, which, as a rule, has little further result than having acted as a gymnastic stimulus to the mind. It is too often overlooked that the making of pattern combines both art and science in a remarkable degree; and if consistently and carefully graded from the capacity of the child to the capacity of the fully-fledged design student, we should see ere long a great renaissance of this woman's art, which can touch every home from highest to lowest, if we can put into the hands and mind of the girl-child this factor for the beautifying of her world, moral and physical. And this may be done with ease if those who teach her will learn their part aright.

Diagram 103 shows the stencil cut for marking a pattern on velvet.

Diagram 104 the same pattern executed on velvet.

Diagram 105 a more elaborate treatment of velvet.

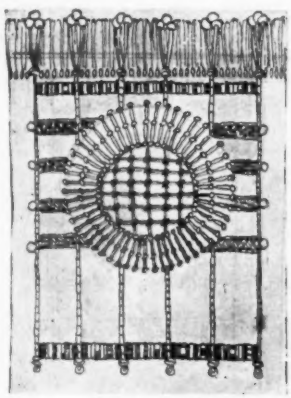


DIAGRAM 109.

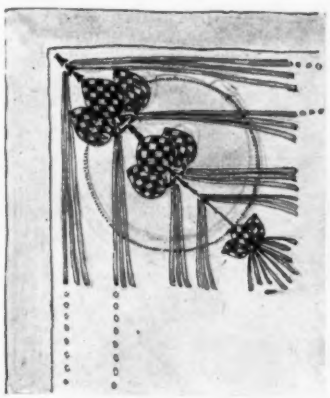


DIAGRAM 110.

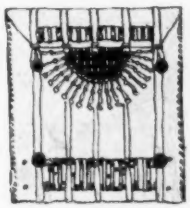


DIAGRAM 111.

Diagrams 106, 107, and 108 show designs based on straight lines only, and executed in tacking stitch.

Diagrams 109, 110, and 111 show combinations of circles and straight lines.

Diagrams 112 and 113 are exercises in straight lines and simple leaf forms.

Diagram 114, a piano curtain in appliqué.

(*Conclusion.*)

ART AND THE BOOK.

OLD TITLE-PAGES: WITH NOTES ON CURIOUS EXAMPLES.

BY W. E. SPARKES.

IT was a stirring age. The Spanish Armada had sailed under a great flourish of trumpets, but had returned, broken and distressed, by devious and dangerous ways, never more to threaten a proud nation. The country, relieved of its anxiety, went forward by leaps and bounds, forcing itself into line with the great powers of Europe. Adventurers set sail from every port; the Spanish Main became a highway crossed by daring sailors, who returned from their quests with strange tidings of new lands; colonies were established in distant countries; trade increased and wealth grew. England became a "nest of singing birds"—Shakespeare, Marlowe, Spenser, and Greene made vocal the exultation of a free people; learning spread with the foundation of schools and colleges; and printing presses were set up in every city and large town. Books were now published in fine editions. Caxton had had much difficulty in getting suitable illustrations, and his pathetic attempts to find good artists and passable engravers in England show how little native talent there was to drawn upon. Had it not been for foreigners—for such men as Hans Holbein—English books would have continued to make but a poor show at a time when the German, French, Flemish, and Italian printers were issuing works that are admired to this day.

No doubt there were English artists and engravers here and there, as we shall see, who gradually began to make themselves known, but they were very few in number. Hans Holbein had been enticed to England. A few years later, after the massacre of St. Bartholomew's Day (1572), French Huguenots began to find homes in our country. Among these were many fine artists; so that not only were foreigners attracted by the honours held out by Queen Elizabeth, but refugees, most of them skilled and intelligent workmen, added to the number of men who were destined to influence English art profoundly.

And, of course, the printed book was among the first things to benefit by this inflowing of art and skill. Our business here has to do, for the moment, only with the changes in the illustration of books.

WOOD-ENGRAVING SUPPLANTED BY METAL-ENGRAVING.

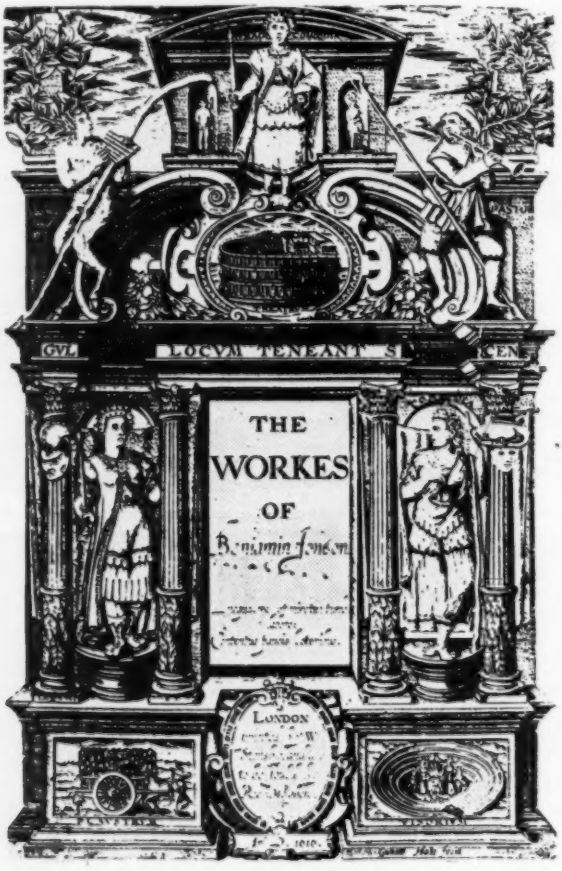
In our last number it was pointed out that wood-engraving showed vast improvement, and the title-page of Henry the Eighth's *Attack on Martin Luther* was reproduced in proof. It was mentioned, too, that wood-engravers could not keep pace with the artists, because they were unable to engrave lines fine enough to please exacting designers—a race of men very hard to please at the best of times, and particularly exasperating if their work is not finely engraved.

What more natural than that they should despise wood-engraving in general, and the wood-engraver in particular? Surely finer lines could be got in metal? So experiments were tried, and it was not long before the poor wood-engraver found his business gone, not to be revived for nearly a hundred and fifty years.

But metal-engravings (where the lines are *cut into* the block) cannot be printed at the same time with type. What followed is easy to be seen. The title-page was entirely engraven, words and all, on a metal plate, and was printed separately. Now, indeed, it was possible to put the smallest detail into a design. No fear now that the engraver should hack and cut away the drawing. But in obtaining these new excellences the rich masses and broad spaces so admirable in old wood-engravings were lost, and it is safe to say that most people with any taste would find these finicking metal-engravings but poor and weak affairs beside the strong and manly prints that were possible to the wood-engraver.

Yet these daintily handled metal-engravings have their own interest too. It was possible now to add details without number, until many title-pages printed at the close of the sixteenth and beginning of the seventeenth centuries are quite a treatise in themselves—often a treatise on nothing in particular, and sometimes entertaining as a puzzle.

Let us look for a minute or two at the title-pages of two famous books printed at this time. They are printed from metal plates; they show how strong a hold the New Learning had on authors; and if there is little imagination there is abundant fancy, which would be "*caviare* to the general," but pleasing to a royal court where they bandied compliments in Latin and Greek, and called themselves and each other by names drawn from ancient times.



TITLE-PAGE TO BEN JONSON'S "WORKS" (1616).

There was never a more savage author than Ben Jonson. He despised the crowd, and took care to let them know it. The prefaces to his plays reveal a man conscious of his worth, but stung with the indifference of an ignorant public. On all hands he saw poor stuff vaunted to the skies. His own carefully chiselled and highly polished sentences were too fine for the crowd, who probably gaped and stretched themselves while the actors in buskin were speaking his most sonorous lines; and it is not difficult to imagine his exasperation as he saw his choicest conceits falling on dull ears. Few authors have commended

their works to a reading public as he did in one preface to a play—" 'Tis good, and if you like't you may." This flaunting " take it or leave it " attitude would hardly tickle the palate of a public which likes to imagine itself conferring favours upon the poor author.

The savage old dramatist will bate no jot of his contempt even when his collected works are published; for here on the title-page he begs for no large public to buy his book and fill his purse, but with a curl on his lip he invites the noisy crowd to make way for the few earnest readers who can appreciate his excellence.

> " Neque, me ut miretur turba laboro;
> Contentus paucis lectoribus "

(" Neither do I strive that the crowd may admire me; content with a few readers ") are the words set out in full under the title.

No publisher would be likely to suggest that as a good advertisement, and the designer would not have dared to insert such a remark on his own account; from which it would appear that Ben Jonson, in his usual truculent way, had insisted upon what should be the fit setting for his title-page. Here in niches on either side are Tragedy and Comedy facing each other, with their names written above—one with the tragic mask, the other with the comic, hung high on a pillar. Tragedy holds his sceptre, is crowned, and wears on his shins the buskins which marked off the tragical from the clownish on the stage; Comedy is less imperially robed. And then, quite in keeping with Elizabethan quaintness, at the top of the page is a figure which (as the name above him indicates) is both Tragedy and Comedy in one—wearing the tragic crown, but minus the buskins.

To the left and right of this strange image are figures which stand for rustic life. This is neither tragical nor farcical, but merely simple and pastoral. Here is Nature unadorned, fresh from the woods and fields, poetical and fit for masques, and holding a station midway between the open country and the lamp-lit stage. *Satyr*, the woodland god, breathes on his pan-pipes; *Pastor*, " silly I, more silly than my sheep," has his crook, and " blows upon his oaten reed."

Thus Ben Jonson touches on the play in many of its phases; and it needed but a larger plate to hint at further and finer divisions—" tragedy, comedy, history, pastoral, pastoral-comical, historical-pastoral, tragical-historical, tragical-comical-historical-pastoral," as Polonius remarked.

For the title-page speaks first and last of the theatre. In the lower right-hand corner there are some quaint figures dancing in a ring round a fire; and this is not a party of children about a bonfire, as you might suppose, but the chorus of a Greek play, who, according to some, moved around the altar of Dionysus placed in the middle of the circular theatre.

And on the left-hand side the uncomfortably crowded cart stands for nothing less than the earliest roving actors; for (so tradition said) before theatres were built in Greece the poets carried their dramas from one town to another, the actors playing from the cart.

Between *Satyr* and *Pastor* you may see the *Theatrum*, with its seats for the audience, and the buildings which represent our present stage—the model upon which the charmed theatres, the Globe (that " wooden O ") and the Rose, on the bankside of the Thames, were built—the theatres where Shakespeare and Jonson trod the boards or acted as stage-managers in days when all London crowded to the play.

Here, then, in this title-page is a whole story of the theatre crammed in little. The engraver, one William Hole, was an Englishman; not, it is true, a very spirited craftsman, but interesting from the fact that English engravers were at length to be found capable of carrying out works of the kind. The design is top-heavy; the drawing is wooden and dull; but there are good lines in the architecture. At any rate it shows promise for the future, though, if it is compared with the marvellous metal-engravings which were then common on the Continent, it is to be reckoned only among the fourth rate.

Title-page from Purchas's " Pilgrims " (1625).

By far the commonest mode of setting out a title-page was that employed by Ben Jonson—that is to say, there was a pillar on either side, against which a figure was placed, and these pillars supported an arch. Various curious creatures were scattered about, some having reference to the book, but mostly mere ornaments to fill a space.

As we have seen above, Ben Jonson's details had a meaning, but his detail was as nothing in comparison with other title-pages, which sometimes contained a history in themselves. A good example is this from Purchas's *Pilgrims*. The sixteenth century was full of romance. Spanish, Portuguese, and English ventured their frail barks among the dangers of uncharted seas; with the discovery of the New World came a sense of an unbounded earth stretching on all sides into the far unknown. Travellers' tales were accepted eagerly, however outrageous they might appear, for had not a cloud been lifted from another world, and shown Incas and Indians living a strange life in strange cities; were there not trees and flowers to be seen, so curious as to seem the growth of an enchanted land?

No wonder, then, that in the sixteenth century books of travels were eagerly bought up. Here is one that had a vogue for many years. Samuel Purchas, an English divine, born in 1577, should have been a sailor. In his quiet life as vicar of an Essex village, Eastwood, his thoughts were continually on the open seas and in new lands. He filled his library with books on travel, and at last determined to publish a work which should generally deal with discoveries, and, incidentally, with the religions practised in these new lands—a geography with a pious commentary; not a difficult matter in those days of fancy, when the divines formed similes on the most unlikely subjects.

In 1613 Purchas published the first of five volumes: *Purchas his Pilgrymes, or Relations of the World and the Religions observed in all Ages and Places discovered, from the Creation unto the Present*—a somewhat ambitious undertaking, one would think. Purchas drew a great deal on old Richard Hakluyt, a Londoner, born in 1553, and afterwards lecturer on geography and astronomy at Christ Church, Oxford. He collected and published volumes of travels and discoveries, and particularly of English travels. He died in 1616, and all his manuscripts came into the possession of Samuel Purchas. It is, therefore, not surprising to find the latter giving due credit to Hakluyt, as may be seen in this title-page.

The divine gives out his title in sonorous tones: *Hakluytus Posthumus or Purchas his Pilgrimes. Containing a History of the World, in Sea voyages and Land*

Travells, by Englishmen and others. Wherein Gods Wonders in Nature and Providence, The Acts, Arts, Varieties and Vanities of Men, with a world of the Worlds

His title-page is as disjointed and as comprehensive as his title. Portraits, maps, and pious comments jostle one another, and crowd for elbow-room.

SCOTIA
He shewed his word vnto Iacob, and he hath not dealt so with any nation. Psal: 147.
Vos autem scitis hoc, quoniam manet inquilinus. Psa: 82. 6. 7.
HAKLVYTVS POSTHUMUS OR PURCHAS HIS PILGRIMES
Containing a History of the World, in Sea voyages & lande-Travells, by Englishmen & others.
Wherein
Gods Wonders in Nature & Providence, The Acts, Arts, Varieties & Vanities of Men, with a world of the Worlds Rarities, are by a world of Eyewitnesse-Authors, Related to the World.
By SAMVEL PVRCHAS B.D.
Anag. Samuel Purcas
PARS SVA CELVM
Imprinted at London for Henrie Fetherstone at the signe of the rose in Paules Churchyard 1624.

Rarities, are by a world of Eyewitnesse-Authors, Related to the World &c." One sees the divine complacently stroking his beard as he eyes this quaint interplay of "worlds" and "worlds"—a proceeding quite in keeping with the fashion, even in sermons.

What more proper to a divine than to head the title-page with a picture of the New Jerusalem to which all pious pilgrims are journeying? He adds the verse: "These were strangers and pilgrims on the earth. God hath prepared for them a city." Beneath this picture

is another, showing those early pilgrims, the Israelites (uncommonly like English soldiers in dress), marching with a curious form before them. This the reference shows to be the cloud that led them by day and became a flame by night.

Beneath the wandering Israelites are two scenes which may be remotely referred to travellers. On the left Guido Fawkes is seen on November 5 approaching Westminster Hall with a lantern; and on the right, under date 88 (that is, 1588), the Spanish Armada is seen in full flight.

Guido Fawkes naturally leads the mind to King James I., wherefore the loyal divine places that king on the throne, with Prince Charles standing near him. The various little remarks around this family group are entertaining, but none more so than the significant Latin tag on the upper edge, "Ego dixi Dii estis et filii excelsi omnes," which may be read several ways, but all not obscurely hinting at the divine descent of kings. This was in 1625, the date of James the First's death, and a year full of threatened rebellion against the Stuarts' claim to personal government. Doubtless Purchas, like many another loyalist, was nailing his colours to the mast.

On the right Queen Elizabeth is seen lying in state, and before her, weeping and holding a skull, is a figure above which the letters H. P. show that this is young Prince Henry, who died in 1612, after a short illness.

Artistically, these little portrait groups, together with Samuel Purchas's own bust at the foot of the page, are the most satisfactory parts of this extraordinary title-page.

On right and left of the title there are thirty heads, drawn from ancient and modern history—travellers and adventurers, beginning with Noah in the ark (quaintly called "the first of shippes"), and passing onwards through the patriarchs Abraham, Isaac, and Jacob down to the English captains living in the author's day. A strange medley, indeed, and comprehensive enough in all conscience. It mattered not to the good divine whether the traveller were the leader of a small nation driven to find a new home, or were an indignant king seeking his runaway wife in a foreign city; Æneas and Menelaus were all one to him. Ulysses forms the third of this strange company—the traveller who saw many men and many cities in his restless wanderings. Solomon, and Hiram king of Tyre, Joseph in Egypt, Nebuchadnezzar in Canaan, Cyrus, Alexander the Great, and "great Cæsar" fitly follow in order—travellers set on conquest. Then by a curious turn of thought the worthy preacher contrasts these violent wanderers with those whose mission was more peaceful, and pictures the twelve apostles, St. Paul, and Joseph of Arimathea (who, according to tradition, first visited Britain as a missionary).

In the remaining medallions one may trace the greatest of modern adventurers—Magellan, Pizarro, Cortes, Columbus, Hawkins, Drake, Cavendish, and Cabot—to say nothing of kings who for various reasons left their native country, chiefly indeed for conquest; Constantine, Richard I., and Canute showing in strange companionship.

To an author whose net was thrown as wide as this there was little difficulty in filling five or fifty volumes. "All the world was his oyster." He could draw on ancient and modern warfare, on legend, or on Scripture; Noah was to him a sailor, and Nebuchadnezzar a traveller.

This astonishing title-page concludes with a portrait and two maps, Purchas in the centre overlooking both hemispheres, and finding in all countries as they open out before the daring voyagers nothing but vain and empty shows. Alexander, Cyrus, and Cæsar are become dust; the tramp of centuries passes over their heads; and through all these noisy marchings and escapes by sea and flood, Samuel Purchas reads nothing but "Verily, at his best state, every man is vanity." You may read these words in the open book he is holding in his hand, with its reference to Psalm xxxix.; and on the extreme lowest corner of the plate on the right he sums up all the pageant of history drawn out in his portraits of kings and discoverers with the words: "Vanitus vanitatum"—"Vanity of vanities."

If space allowed, it would be pleasant to speak of his quaint conceits and quotations; to the snail bearing the world towards the blazing sun and stars—creeping time travelling till it is swallowed up in eternity—and other choice fancies. It remains to be said that the history of title-pages would be only a reflection of the times. Ben Jonson and Samuel Purchas were true Elizabethans in their love of classical learning, and in their admiration for quaint and far-fetched allusions; and this may be seen even in their title-pages.

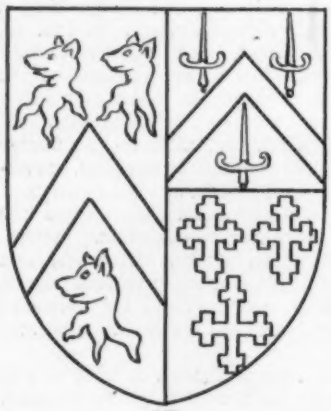
THE HISTORY LESSON AND DRAWING.

HERALDRY.—II.

BY W. H. ELGAR.

WHEN speaking of the methods of marshalling various charges on one shield, as those of a gentleman who marries a second wife, reference was made in Part I. of this paper to an alternative arrangement of placing the three charges side by side, thus dividing the shield into three equal parts vertically. This alternative arrangement is called *tierce*, and gives an opportunity for the defence of heraldry when it is attacked as not being an art. Take Fig. 21, which is a drawing from a brass to a lady named Maston, whose arms, consisting of three crosses *croslet*—two over one—occupy the last division; whilst her husband's, consisting of a *chevron* and three dogs' heads *erased* (torn off), are in the first, followed by those of his first wife, also a chevron, but accompanied by three swords *erect*, in the second compartment. Arranged in the usual manner, they come as in Fig. 18, where the swords become so short as to be thought daggers, while the crosses assume more normal proportions, which is an advantage by no means outweighing the loss of clearness in the swords.

Edward the Confessor's arms, as they occur in the porch of the Guildhall of the City of London, are sketched



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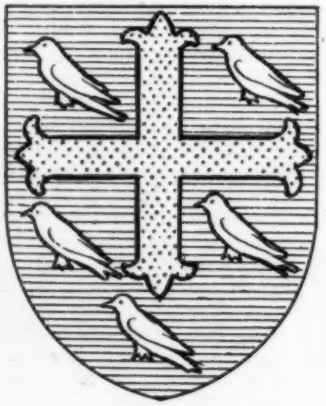

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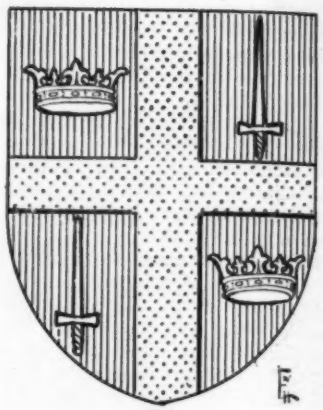

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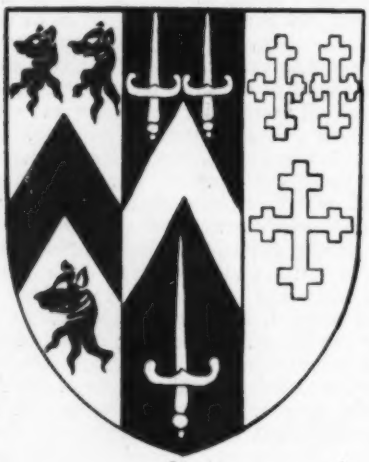
in Fig. 19: Azure, a cross flory, and five martlets, or. The cross flory is the French combination of the cross and the fleur-de-lis. This has been given for comparison



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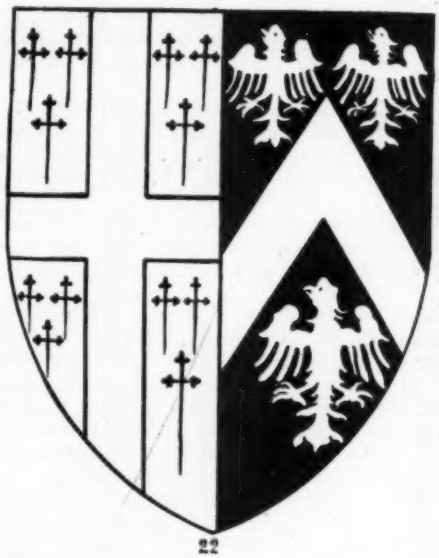

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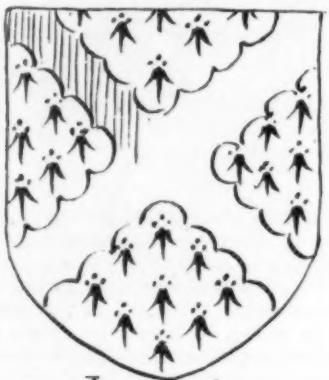
with the arms of Eye in the centre of our coloured plate; the colours are the same, one bird is omitted, and the chief of the shield is occupied by an eagle with wings extended. There is probably some reason for the use



Ingoldsby.

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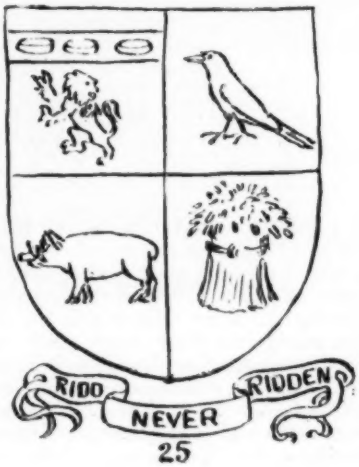

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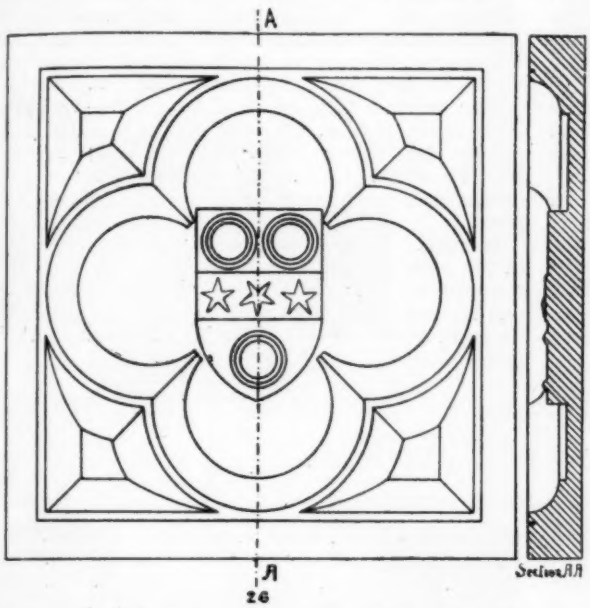
of these arms for the borough of Eye, and it was quite by accident that they were noticed. Surprises of this kind make the study of heraldry very attractive.

What more appropriate symbols could be chosen than



26

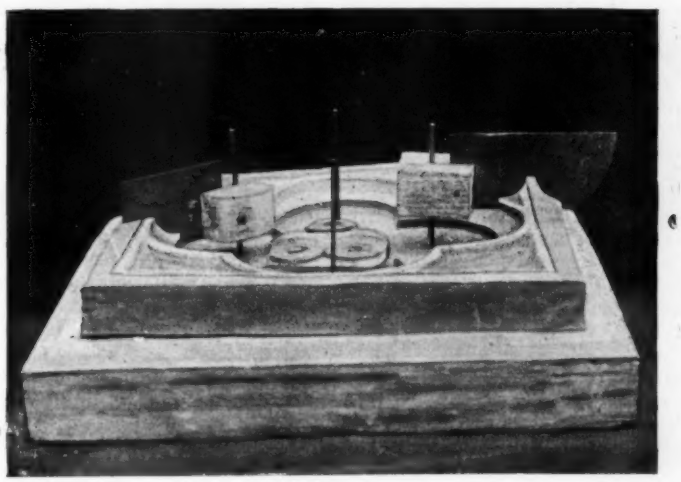
those of Battle Abbey (Fig. 20), a gold cross on a red ground, with two royal diadems and two swords. All our early kings wore diadems of this shape.

Two of our illustrations (Figs. 21 and 22) are traced from rubbings of brass shields. They are included as examples of different treatments in different materials of the same subject—a point now so often overlooked. Fig. 21 has already been described. However, the variety in the form of the torn portions of the dogs' heads, the positions of the ears, and the internal markings tell us that the artist was using his brains as well as his hands.

Much the same might be said about the eagles displayed, wings inverted, and the crosses bottony (trefoiled ends) of Fig. 22, the arms of a Tourney of Brockhill, Kent.

28.

While on the subject of treating various materials, we will refer to Figs. 26, 27, and 28, which represent a panel from the bowl of the font of Ashford Church. This font, of the time of Edward the Fourth, was erected by



27.

Sir John Fogge, controller of that monarch's house, who rebuilt a great part of the above church, and the arms on our panel are his: Ar, on a fess (that is, bar) between three annulets, sa, three mullets (rowels of spurs), pierced of the first (colour).

A careful drawing to scale with section Fig. 26 being made, a block of wood was prepared, and the principal points marked upon it. Then little metal

templates of the moulding section were cut, one double and one single, as seen in Fig. 27, where they have been dropped over the pins to show their manner of use. The pins were made from knitting needles cut to 2¼ in. lengths filed flat at one end and pointed at the other. This may seem unnecessary, but they drive so much truer for the trouble. The curves being struck, the single template was used to strike a long straight piece of moulding for the frame, much in the way that the mouldings described in the June number of the *Practical Teacher* were struck. Lastly, the shield was made and attached to the centre of the panel. The complete panel is shown (Fig. 28).

References to heraldry are constantly occurring in literature, and it is as well to try to realise what is described. Here are two attempts, Fig. 24 being the arms that Barham describes as belonging to Ingoldsby, when insisting upon the details of his famous "legends" in the preface—namely, ermine, a saltire engrailed gules; while Fig. 25 is an attempt to show the arms granted to John Ridd by the king (*Lorna Doone*, chapter lxix.).

Some little careful attention to a writer's points surely would be wholesome just at present, for most likely considerable trouble was taken either to be historically correct or ludicrous, as the case may be.

In English heraldry gold is by no means always used, nor is silver. It will perhaps be convenient to give the pigments usually employed, simply remarking that they are selected because of their distinctive character. Gold—chrome yellow; sepia for shading tint. Silver—white; neutral tint for shading. Red—vermilion, high lights touched up with yellow; shadows in carmine (see Tudor Rose). Blue—cobalt; Prussian blue for shade. Green—varies with artists; a little darker than emerald; bice probably; shadows sap green.

It would have been interesting to trace the changes in the royal arms and its supporters, the use of arms at tournaments, etc.; but this paper is already very long, and the real valuable purpose will have been served if we begin to use our eyes and think intelligently on this grand old art.

HANDWORK FOR JUNIORS.

BY H. WAY, INSTRUCTOR SCARBOROUGH SUMMER SCHOOL.

"TO make a child intelligent and adaptable by practical methods in teaching" was the substance of a statement made by a much-respected teacher some time ago, and this idea will permeate the series of articles to appear in this journal under the above heading.

Great diversity of opinion exists among the advocates of more practical work as to the best methods to pursue; and there are those who express their belief that handwork is the true foundation of all education, while others declare that handwork is a method in education. Whichever view we take, the aim is the same—that is, to induce the children in our charge to put their best individual efforts into the matter under consideration.

Among the greatest problems facing a teacher before a large class is the difficulty in judging when the children are all actively engaged in assimilating to themselves the points under observation. Oral lessons particularly present this difficulty, unless accompanied by some means of testing the amount grasped by the minds of the children. With little children the means of testing are very limited, unless some medium is used upon which the children can express themselves. The medium of greatest value at this stage is clay. While engaged in portraying the subject of the oral lesson, the children's minds are actively occupied in putting in all that can be thought of; interest is intensified, concentration cultivated. Let us suppose that a lesson in geography is being given to a class of young children in the senior school, the objective being hills and mountains, the subjective some local eminence. By questioning the teacher draws from the children as many different observations as possible—looking upwards to the summit; easy ascent at first; more difficult later; how the man guides his horse; two horses needed in some parts; easy walking upon a level part; hard climbing again; loosened stones rolling down; slipping back; the stone behind the wheel as the horse rests; the top reached; the view from the top; another high point farther on, to gain which necessitates a descent and another climb; and so on. Now let the children make a hill in clay, and in the result will be seen each one's individual expression of the ideas formed in his mind. Again, the teacher by judicious questioning, this time individually as he proceeds round the class to view the work, encourages the children to talk about their work, points out matters overlooked, and so judges *to what extent he has roused the interest of the individuals.* From these illustrations, drawn from home, he can picture to his class the objective of the lesson—namely, hills and mountains. Where clay is not readily available, sand may be employed in these early lessons. Practical illustration thus becomes geography; the hands are employed "to the advantage of his intellect."

Paper and card are excellent media for employment in this illustrative work; in many schools they will be the most easily adapted. They can, too, be most effectively used in connection with the teaching of form, geometric principles, arithmetic, and the use of drawing instruments. If made use of in the right way, their manipulation becomes an excellent introduction to the forms of handicraft most generally adopted, woodwork and metal-work. Another advantage lies in the fact that they can be employed in the ordinary classroom; also, the tools are few, being in the early stages the ordinary drawing instruments and scissors.

Suggestions of methods of using paper and card will form the first portion of the articles on Junior Handwork.

There are certain preliminary exercises which must be given when new tools are placed in the hands of young children, but these exercises need not be prolonged, and in many cases they may be taken immediately before putting into practice. There is little, if any, use in teaching things and ideas of no *present* value, the application to come very much later, perhaps years later. What use is there in teaching a child to bisect a line by a geometric method, if he never applies

FIG. 1.

FIG. 2.

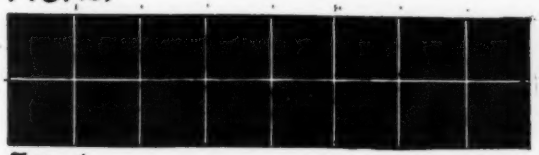


FIG. 3.

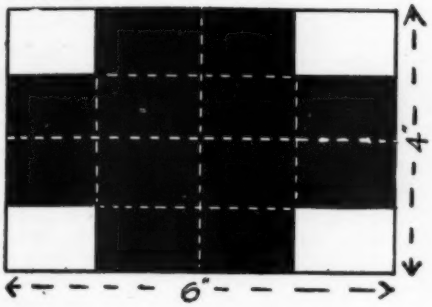


FIG. 4.

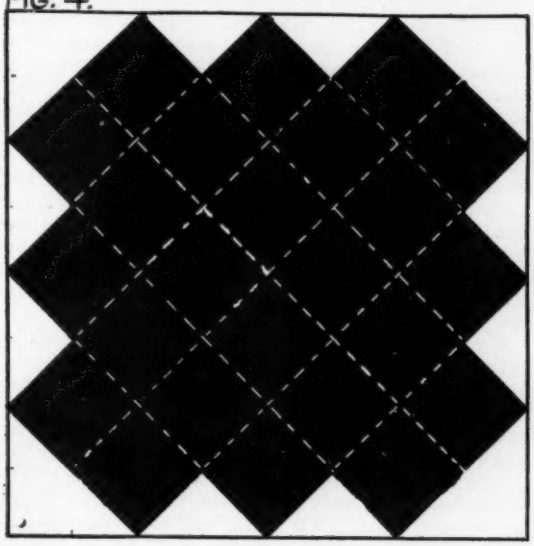


FIG. 5.

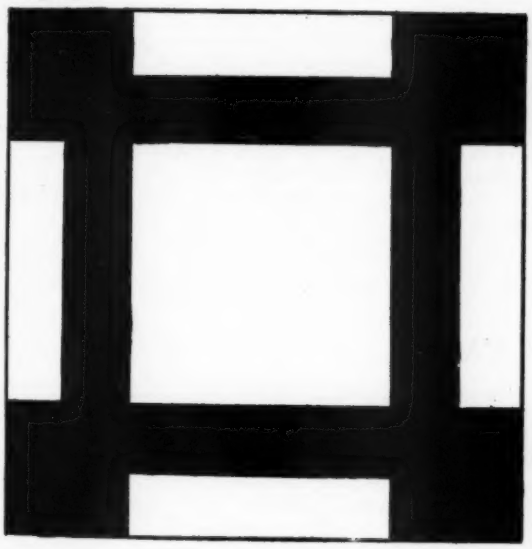


FIG. 6.

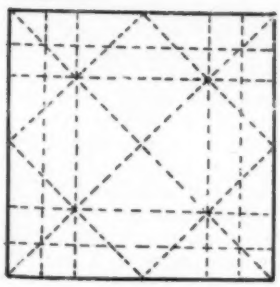
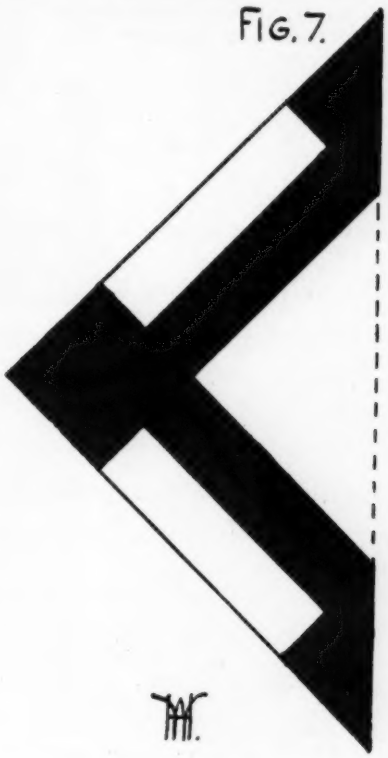


FIG. 7.



the process? By all means let him learn to bisect a line *when* he comes up against the line that has to be bisected.

It is sometimes said by theorists that children should be left alone to find out the possibilities of a tool for themselves. Such enthusiasts deserve ridicule, unless they can guarantee a perfectly calm demeanour after sitting on a newly painted seat, not duly labelled "wet."

Give children hints as to the best methods of holding the instruments and tools you place in their hands. Let them practise the use on waste material before applying to the object being made. In using the ruler and pencil, give preliminary exercises in drawing lines in a certain position. The following plan should be used throughout the exercises in these articles:—Place the point of the pencil in the spot from which the line is to be drawn; bring the ruler against the pencil; hold the ruler firmly by the tips of the fingers of the left hand, then draw the line. If the line is to join two points, put the pencil in one point; bring the ruler to the pencil; place it in line with next point; test its alignment by moving pencil to that point; when sure the ruler is properly placed, draw the line.

Give children instruction in the best methods of holding scissors and cutting with them. Take strips of paper, fold and line them as directed in the instructions to Fig. 1. Open the scissors, held in the right hand, bring the paper by the left hand into the opening, and cut slowly down on the lines. For a longer cut prepare strips as directed in Fig. 2. Cut to the middle line with one cut, open the scissors, move the paper into the opening by the left hand, and complete the cut. Children will soon learn that the best way to use the scissors in this work is to keep the cutting hand steady, making the movements of the paper with the left hand.

PRACTICAL WORK.

Fig. 1. *The Child's Scale.*—Give children strips of paper 8″ by 1″. Fold first in halves, open, fold each end on the centre line thus obtained, open, fold each end on these new lines and on the second line from the opposite end. Mark spaces 1 to 8. Fold line 8 on line 7.

Fig. 2. Strips of paper 3″ long, 2″ wide. With scale, Fig. 1, let children measure the edges. Simple calculations may be made.

Fold the strip as above, with scale mark off 1″ on the short edges of the strip, and draw a line across the strip.

Fig. 3. Give each child a piece of paper 6″ by 4″. Measure the edges with the "scale." Again simple arithmetic calculations should be made. Fold by placing the shorter edge against the opposite edge, rule a line along the fold, measure from the end of this line to an opposite corner (= 5″). Complete the folds as indicated by the dotted lines; rule lines along the folds. Cut off the corners and measure the edges of the corners cut off. The shape remaining may be used in various ways—to illustrate simple subtractions, or to build up multiplication tables.

Fig. 4. Give each child an 8″ square; fold diagonally, as indicated by lines. Cut out the shape, always making cuts from the outer edge inwards. Rule lines before cutting. This figure gives further exercise in ruling and cutting, and may be used for further practice in subtraction or building up tables.

Fig. 5. Give each child a square, 8″ side, of brown or coloured paper; measure the length of the sides; calculate the distance round (4 times 8 = 32). Fold as in Fig. 6, diagonals first. Cut outside waste pieces away, fold as in Fig, 7, and cut out inside square.

Measure all the edges with the "scale."

The object may afterwards be used as a frame for a picture card.

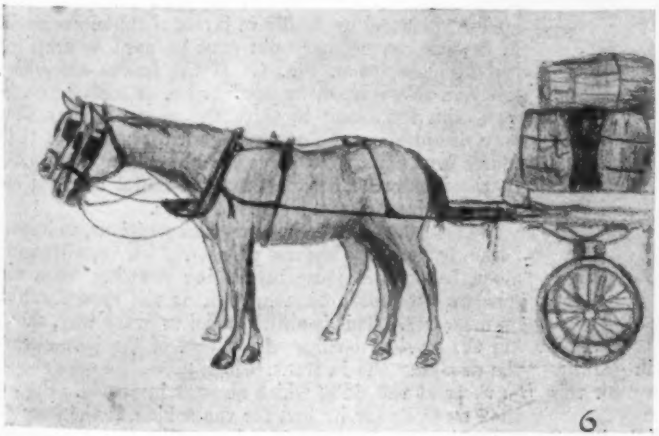
HONOURS PAGE.

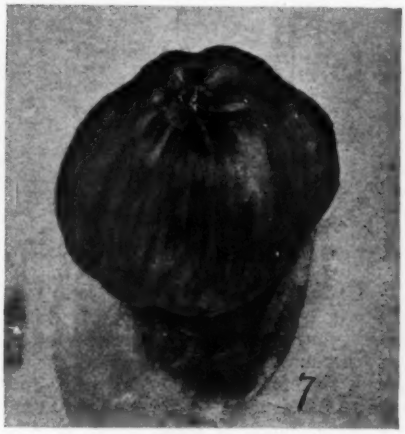
THE pupils to gain first honours in the New Year are:—

1. Frank Mawson (14), Archbishop Holgate's School, York.
2. William M'Knight (13), Camden Street School, Glasgow.
3. William L. Birch (13), St. Luke's School, Kingston-on-Thames.
4. Chris. Toon (14), Basingstoke Council School.
5. Charles F. Darke (13), Grange School, Jarrow-on-Tyne.
6. Mabel Birch (16), Pendre School, Prestatyn, North Wales.
7. H. Anning (13), Holy Trinity Boys' School, Barnstaple.

Commended.—Edward Yardley (13), Enderby Council School; Arthur May (13), Earle Road Council School, Liverpool; Herbert Waine (13), Earle Road Council School, Liverpool; Harry Sowerby (13), Earle Road Council School, Liverpool; H. Miller (12), Earle Road Council School, Liverpool; Clifford Barker (11), Trewirgie Boys' School, Redruth; C. Blackwell (12), Trewirgie Boys' School, Redruth; Percy Tamblyn (14), Trewirgie Boys' School, Redruth; Fred Wyatt (14), Trewirgie Boys' School, Redruth; William Whittle (13), Allanson Street Council School, St. Helens; George Slater (13), Haxby Road Council School, York; Florence M. Thursby (10), Woodlands Park School, South Tottenham; Winnie Fowler (10), Woodlands Park School, South Tottenham; Stanley Parker (14), Wesleyan Higher Grade School, Gillingham; A. Lemon (13), Holy Trinity Boys' School, Basingstoke; Lorne Delaney (15), Notre Dame School, Everton Valley, Liverpool; Alfred Phillips (13), Enderby Council School; V. Foot (13), St. Luke's School, Kingston-on-Thames.

We are glad to see some pupils between ten and twelve years of age getting into the commended list. The drawings sent from Woodlands Park School were very good, but too delicate to reproduce satisfactorily. There is no bar even to scholars in the infant classes sending up drawings. Age is always taken into consideration in judging the work. Up to now the senior pupils have had almost a monopoly of the prizes, but we should be glad to see some going to the juniors. It is not advisable to send up too many drawings from one school, nor, as a rule, more than one example by the same pupil.





HONOURS PAGE.

BEAUTIFUL MODELS FREE OF COST.

BY AGNES E. FARMAN.

WHY do we still keep to the old-fashioned division of subjects in drawing—the term model-drawing being applied to things that man makes as opposed to that of Nature drawing, the things which God makes? Is not Nature far finer than anything we can give the children to draw of our own manufacture? We do not make half enough use in our schools of all the models with which she supplies us.

The rigid manufactured objects—such as boxes, tables, chairs, pots and pans of all sorts—have a definite value

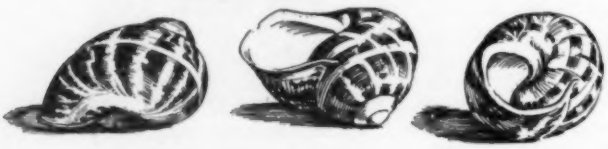


Fig. 1

for teaching general principles in that they are stationary, and the practice in the regularity of line is a discipline through which every child should go. The best in form are those the shapes of which have developed from their use; but too often ugly, commonplace things are thoughtlessly selected. The homes and surroundings of many of the children are ugly enough; there is no need for further ugliness to be taught them in school. It is sometimes argued that the sordidness of their surroundings blunts their senses to the appreciation of refined things; let them be given more of Nature's models, and be shown the beauty in their colours,

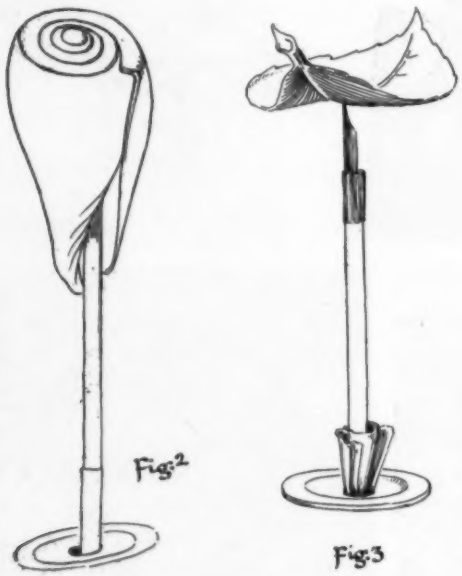


Fig. 2

Fig. 3

shapes, and lines, and they will soon begin to see and understand. They are naturally interested in growing things, therefore it is only necessary to carry on this interest, the foundation being already there.

Further, much is often heard of the difficulty of obtaining suitable objects in sufficient variety for the different classes; but in reality it is only necessary to go to Nature to find beautiful models free of all cost, except that of a little time spent in the selection from among a wealth of materials. The burden of procuring fresh things for each day's lesson may be so minimised as to be hardly worth considering, if the teacher possesses the "seeing eye," and makes use of what lies immediately in his path, and of what is often consigned to the dust-heap as worthless.

Many people will certainly assign a common snail shell to the latter category, but a little consideration will show its value as a model. The general shape is good, and offers many points of interest—the rounded surface of the outside, the hollowed one leading to the mysterious curves within, the spiral end and the beautiful lines of pattern moving over the surface, also in spirals, crossed by lines radiating from the apex towards the opening (Fig. 1). Any such shells may be placed on the desk by the side of the pupil; or if a higher position is needed, lodged on the pages of a book standing on its end; or they may be balanced on the end of a penholder, as in Fig. 2.

Single leaves of hardy shrubs make capital models if presented in an interesting way—that is, in the posi-

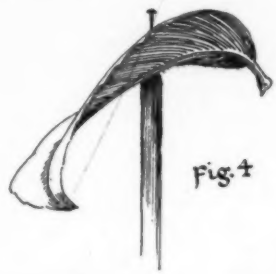


Fig. 4

tions they assume when growing. The penholder will again be useful for holding them (Fig. 3). The nib is not injured for writing purposes if it is only inserted in the softer parts. In order to prevent the other end from touching the ink, a firm screw of paper may be pushed into the ink-well, and the blunt end of the penholder will stand up firmly in it; or if the nib is placed in the ink, an ordinary pin may be used to keep the leaf in place, as in Fig. 4. If the leaves are poised freely in this way, every modulation of surface can be seen, and it is easy to trace the edges, though they may disappear and reappear more than once in their course from point to stalk, as is seen in the holly (Fig. 5). In the illustration this leaf and the laurel above it are placed horizontally on a sheet of paper.

Studies such as these in numerous positions, to impart a knowledge of the natural position of leaves, will ensure much better and more interesting drawing when the scholars attempt a branch, such as the rhododendron on page 547. This is a fine model in every way, showing the gradual change of position of the leaves from the drooping one in front, which gives the true shape, to those at the sides, which show it in profile. Sprays such as this may be had for the asking, if the purpose for which they are required is explained to the owner.

Seed Vessels of Henbane—
Poppy
Rhododendron—

As the flowers have fallen, the spray is unsaleable, and is of no use for decoration. Rhododendrons are fairly hardy, and will last some time; and as the leaves spread in every direction, they will serve as a model for a group of children.

The wonderful beauty and vigour of the curves in the seed vessels, their strong living lines, and the rhythmic arrangement of them in groups of pods and leaves should be emphasised. If the prominent lines of the specimen illustrated are selected, they seem almost Greek in character (Fig. 6). The fine curves of the single pods are in themselves worth drawing (Fig. 7).

Hundreds of seed vessels of the garden poppies are cut down and thrown away every summer; it is only necessary to beg for them at the right moment to obtain any quantity. Two different kinds are shown on page 547, but there are many varieties of shape, each fixed firmly on the strong upright stem. The stages of ripening, and the gradual rising of the crown, present many strikingly beautiful forms. So with the seed vessels of wild flowers. These last stages of plant life are often so unobtrusive that they are not noticed, and endless opportunities are missed of collecting examples that might be used for drawing lessons, for the dried pods will last.

The henbane on page 547 is an instance. The seeds are dispersed, the husk has stiffened into a kind of vase form with an edge of pointed divisions, and as each one in its place on the stem takes a slightly different position, it gives ample opportunity for practice in *feeling* the circular foreshortening, which is the basis for fixing the points of the divided edge.

Flowers of the daisy tribe, again, make splendid

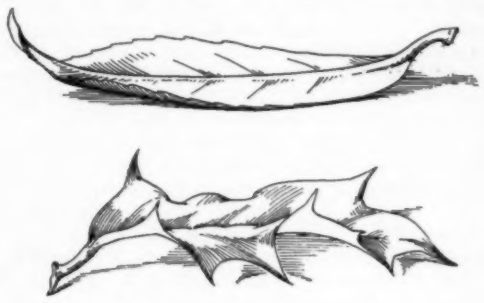


Fig. 5

models (Fig. 8). Some throw their petals out in nearly straight lines, others in curves; in some the yellow centre is flat, in others it stands up like a cushion, and the petals droop backwards from it. All these differences give fresh exercises in drawing, and in the summer a plentiful supply of daisies of some sort may always be had. Positions at or near the eye-level may be

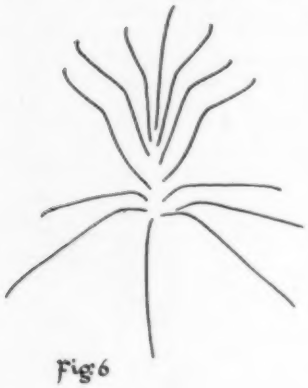


Fig. 6

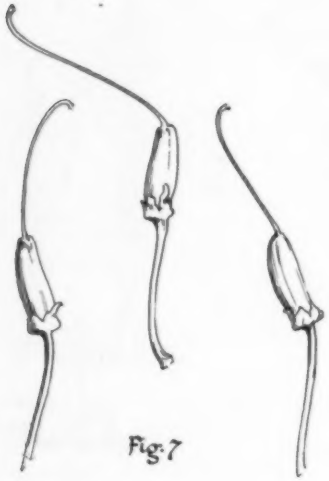


Fig. 7

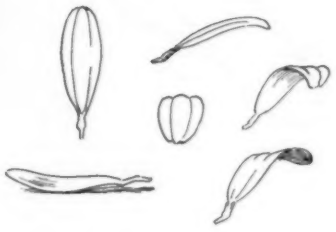


Fig. 8

obtained by pinning the stalk to the penholder if the flower is not strong enough to support itself. Daisies are difficult to draw well. Scholars often take every scrap of life out of them by drawing a *typical flower* in a stiff position, instead of the living one placed before them naturally. Every white petal has a curve of its own, and if a few are laid on a sheet of paper, it will soon be seen how far from flat they are. It is with them as with leaves and feathers: all are curved, not only in one direction, but across the width as well as along the length. When a number of such forms are growing together, as in the daisy, it is as with a group of common objects: the whole must be one thing, but each separate unit must be carefully considered and drawn.

These few exercises among many are sufficient to show the invalidity of the plea of expense or inability to obtain models as an excuse for a dull or weak lesson. Nature has been so lavish in scattering her gifts before us, that it is only necessary to make a careful selection, and to bring sympathetic intelligence to bear on them, for all their beautiful possibilities to be realised, and for the lessons to become really an education.

SIMPLE CRAFTS FOR SECONDARY SCHOOLS.

POTTERY.—II.

BY J. YOUNG, GLASGOW HIGH SCHOOL.

IN last month's article I described methods for the making of buttons and hatpin heads. When any one of the efforts made by the pupils proves to be a very successful design, the pattern should be reproduced by casting, so that any number of replicas may be made. The method is simple, and any one can do

FIG. 1.

it. Place the modelled design while it is still soft on a plain glazed tile. Surround this at a space of about half an inch or three-quarters of an inch with a wall of clay, as in Fig. 1. Make this clay wall over an inch in depth or more, according to the height of the design; then see that the under edge of the clay wall

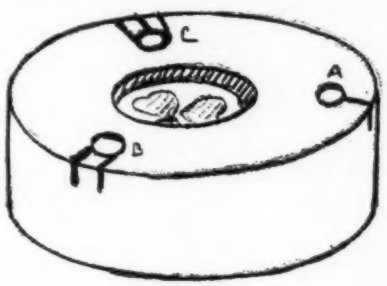


FIG. 2.

is well worked down on to the tile both inside and out. This makes a water-tight well, into which the liquid plaster of Paris is poured. In the centre at the bottom you have the pattern face up. See that all is neat and clean; then in a saucer or small bowl put some clean water, and sift into this sufficient plaster of Paris to fill the whole cavity. Stir it well to make sure it is thoroughly mixed, free from lumps, grit, or air-bubbles; then pour in gently over the edge of the clay wall. With a soft camel-hair brush guide the liquid plaster thoroughly over, and into every crevice of the modelling; then fill up quickly and trim the top level.

This will set quite hard in a few minutes' time, when the clay wall may be removed, and the mould with the original model in it gently removed from the tile by sliding it over the glazed surface to the edge.

With a wooden modelling tool carefully remove the clay model; in doing this one must be very careful not to touch the inner surface of the mould. If the clay is soft, and the pattern in its inner surface not *undercut*, it should draw out quite clean and in one piece by inserting the modelling tool into the middle of the back and pulling gently. The result should give you a mould whose inner surface is the exact reverse of the original design as at Fig. 2. This must now be dried before the fire, when it is ready for use. You squeeze in soft clay into hollow mould; form the back into a button catch or neck for hatpin head. Pierce the necessary holes while the clay is soft; then let it dry a bit in some warm place for a few minutes, when the natural shrinkage and hardening of the clay will render the removal of the piece an easy matter. This can be repeated indefinitely, and many copies can be made. A counter mould for button or hatpin can also be made, which saves time and risk of error in making the form of the back. To do this, leave the finished clay model in the mould; make three impressions on the face of the mould, as at A, B, and C, Fig. 2, to the depth of about the sixteenth of an inch. Cut a deep scratch from the first mark out to the edge, and partly down the side also, two marks from the next and three from the last. These will guide you in placing the two moulds together when making the replicas. Now put this down as before on a tile, and build a wall of clay round it twice as high as it was before, but quite close to the edge of the first mould. Take a stiff brush and rub the exposed part of the first mould with soft soap. Keep rubbing this till a skin has formed; then pour in plaster of Paris as before, and so on, to make the counter mould as at Fig. 3.

Buttons after firing are complete and ready for

use, but the hatpin head has to be mounted. This is easily done. Hatpin stems may be had very cheap from any working silversmith, or they may be got by smashing the little glass beads from the very cheap hatpins one can buy at any small shop. Fill the hole pierced in head with sulphur or a small bit of marine or elastic glue; heat the end of the stem to redness, and

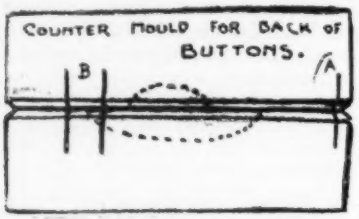


FIG. 3.

insert it in the hole as at Fig. 4. After a moment's setting it will be found quite fast and ready for use. Figs. 5 and 6 show better methods for mounting up roundels for hatpins and brooches. They imply, however, a knowledge of soldering and the working of metals generally.

To one who can do this the diagrams are sufficient

FIG. 4.

explanation of the method; but if one is not proficient in soldering, it is better to take pieces such as those which you wish to use to a working jeweller and have them set.

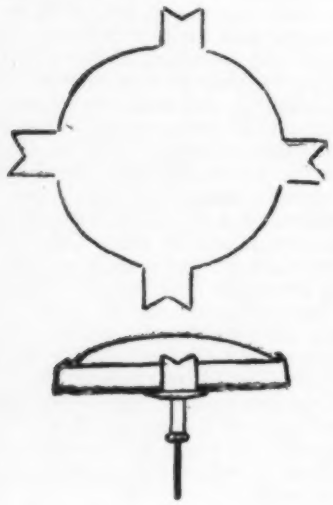


FIG. 5.

On page 551 there are coloured illustrations of some small plates, dishes, hatpins, and jugs which, with two exceptions, have been formed by the students of the High School, Glasgow, entirely by hand. Each form has been built up and modelled in the most primitive method without the assistance of any mechanical aid whatever.

The method of procedure is somewhat as follows:—Each boy wedges and tempers a piece of clay, and rolls it into the form of a ball about the size of a golf ball. This is then flattened into a disc about three-quarters of an inch thickness. This should be done quickly, for the hands soon absorb moisture from the clay, and it begins to crack at the edges—a thing which must not occur in the making of one of these dishes. Immediately you find signs of cracking at the edge you must stop and mend it up by working in a piece of new clay, and moisten all round with the sponge; or, if the cracking

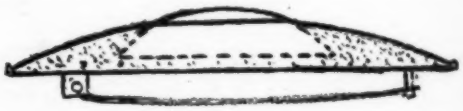
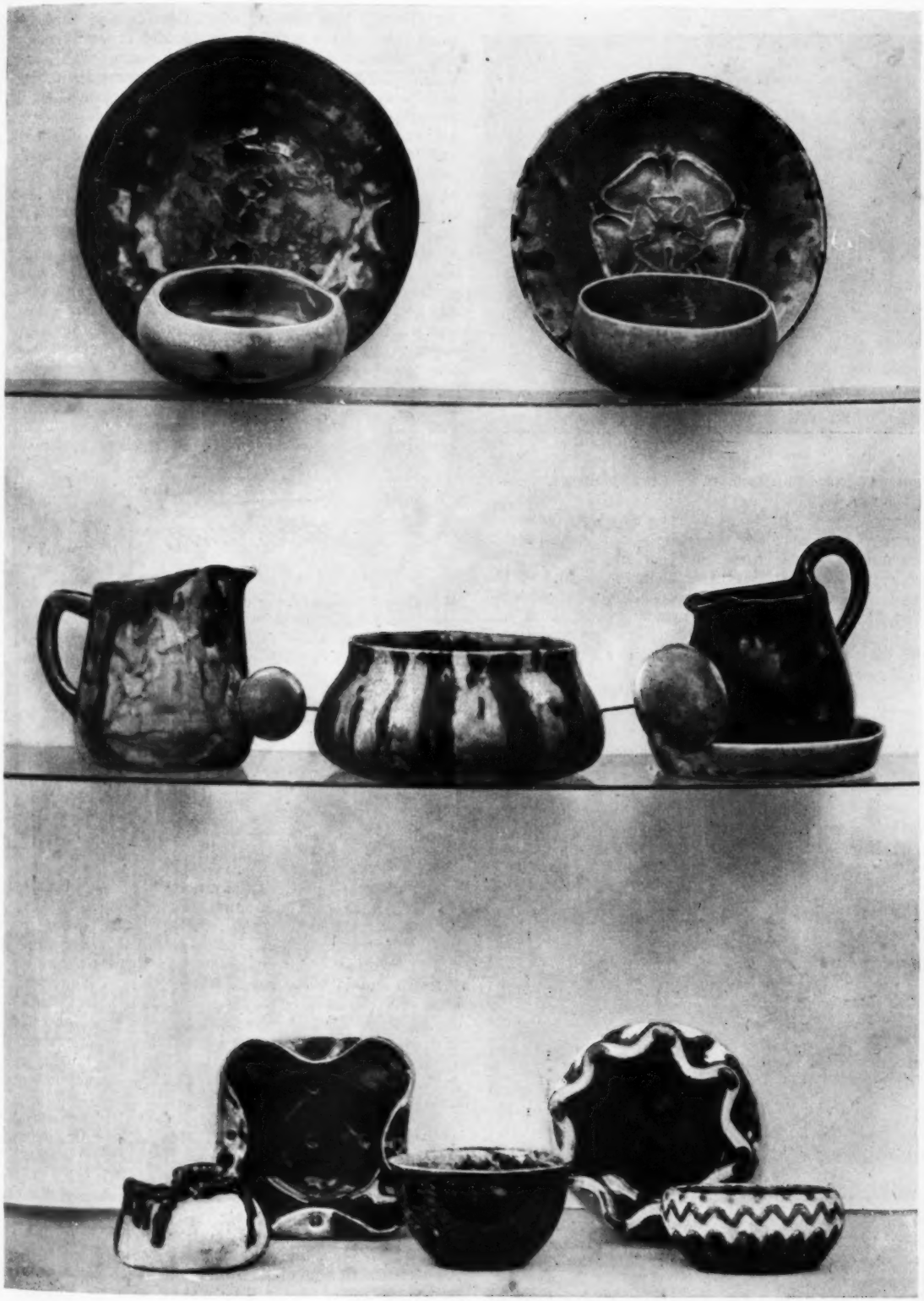


FIG. 6.

is considerable, it would be better to throw the piece aside and commence again.

When the disc is complete put it down on the table or board; a dry part is best. See that the thumb is clean and moist; place it in the centre of the clay disc; turn the thumb with a circular motion, and gently press downwards. The disc will (Fig. 7) gradually assume the bird's-nest shape, and you must stop when you have reduced the thickness at the centre to about one-quarter of an inch. Next lift the piece of clay; put the thumbs inside the hollow, and with the fingers outside press inwards, commencing to raise the side wall and to reduce it also to the same thickness as the bottom (Fig. 8). Be content to do this little by little, and go fully round and round with each operation. I mean, do not get the thickness suddenly thick and thin. Continue this operation, and raise the thick part higher and higher. Do not get any of it at this stage thinner

FIG. 7.



BOWLS, PLATES, ETC.

Fig. 8.

than a quarter of an inch, and see that it does not crack at the top edge. Finally, reduce the top part to the same thickness. In doing this the clay must go somewhere. You reduce the thickness of the wall, and the wall must expand, grow wider, or rise higher. Now you can make it do either of these, according to the way you handle the clay, and you can turn it outward like a bowl or plate, or inward and upward like a jug. To expand and widen the dish you press outward with the thumbs over the fingers (Fig. 8); to contract the area of the top press inward with the fingers against the thumbs, forming a thick part or a scalloping of the edge (Fig. 9). Repeat gently until this irregularity disappears and the opening is as narrow as you wish it to be. Handles must now be added if the piece is to have them. These should be modelled and shaped apart, and then fixed to the piece with clay water. Then hold the dish up on a level with the eye, and test it all round to see that the profile form is all that you wished it to be, and make sure that it is the same all round, after which it is better to set it aside in a warm place for ten minutes or

Fig. 9.

so. During this time it will have set and hardened somewhat, and you can now handle it with greater ease, without knocking it out of shape with every touch. Repeat the whole thinning process again, and with your thumb and modelling tools do your best to smooth, polish, and model the inside. It is then put aside to dry thoroughly. Next day, or when it is hard and "white" dry, the outside surface *may* be further polished, and the thickness of the dish reduced and equalised. The shape may also be altered and amended to a certain extent by scraping the outside with a knife, and polishing with sand-paper, blotting-paper, or even by simply rubbing the thumb or finger over the surface. This, however, is more mechanical, and removes all evidences of the finger touches, so that if the piece has any good modelling on it, or is at all irregular in shape, and would so render it difficult for the knife or sand-paper to reach the surface, it is better to leave it alone, and proceed with the glazing; or, if it is to be fired as *biscuit* ware, to put it at once in the kiln. Placing in the kiln is rather a difficult matter sometimes. You must study to have a sufficient number of pieces to fill up every bit of space within the muffle, else it is a waste

Fig. 10.

of fuel. Biscuit-firing is comparatively simple, since it does not matter much whether the shapes touch one another. But when firing glazed pieces, great care must be taken to isolate every piece, and place each one

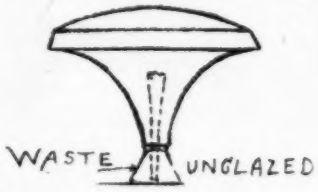


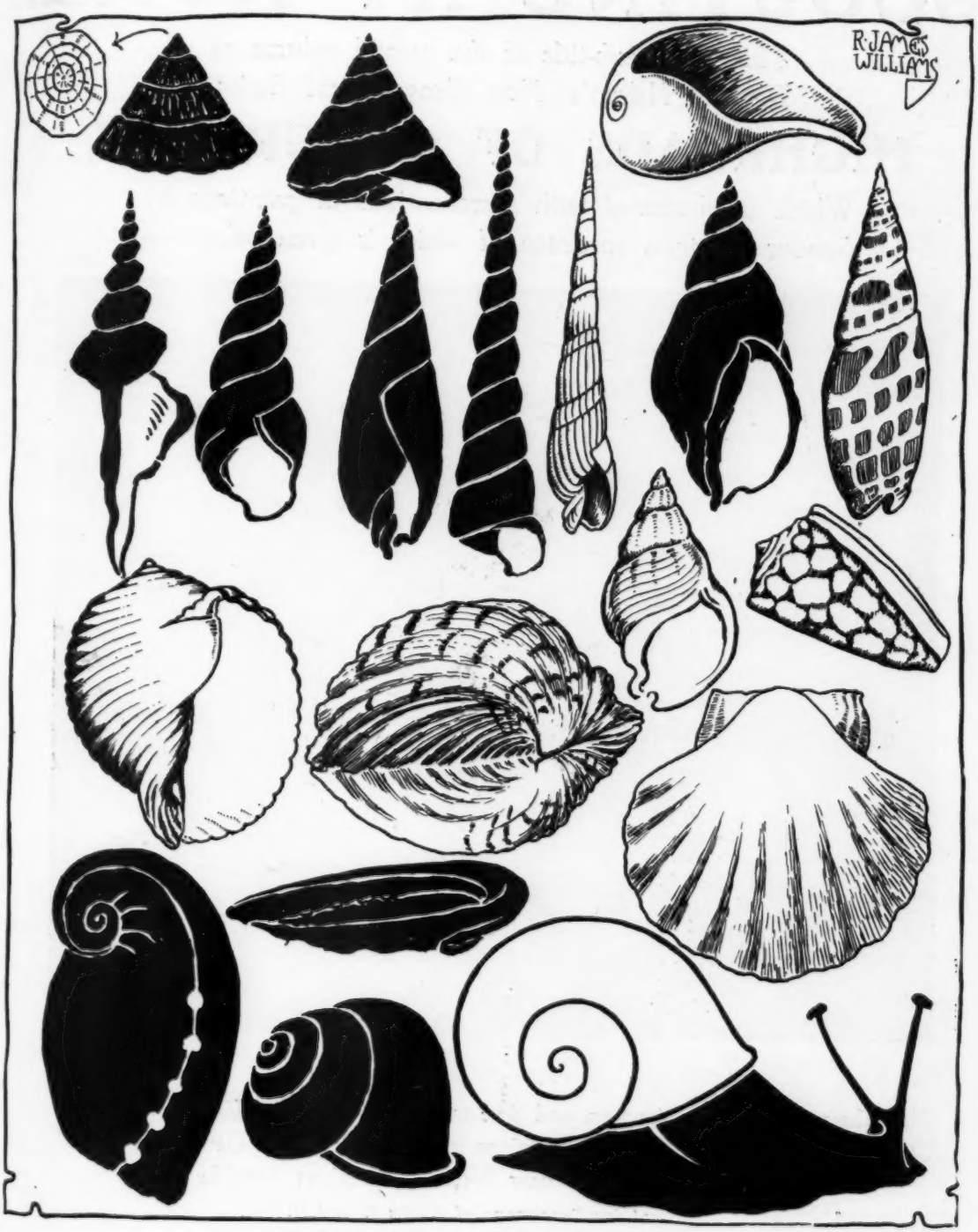
Fig. 11.

on a *stilt*, so as to reduce the necessary point of contact with its support to a minimum.

These stilts are very cheap, and can be had from any pottery or any dealer in potters' materials. For firing glazed buttons or hatpin heads the methods shown at Figs. 10 and 11 will answer. A clay slab is made with little projections all over its surface, and spaced sufficiently apart, so that when a button is placed on each they will not come in contact. You will notice from Diagram 10 that each projection on this slab has a small depression into which the catch of the button rests; this portion must not be glazed.

Fig. 11 shows a method for hatpin heads where a waste piece is left in the shank. This is easily broken off after firing; a little rubbing on a carbarundum stone will soon polish the broken end.

The two exceptions referred to on our coloured plate are the top right-hand saucer with the modelled Tudor rose, and the centre cup at the bottom. The first was done by *pressing*, and the second by *casting with slip*. A short description of these methods, with some notes on the making of tiles, will form the continuation of this series.



SUGGESTIONS FOR THE TREATMENT OF SHELLS.

SCOUTING AT HOME.

This is the sub-title of the second volume of
Messrs. Nelson's New Geographical Series,

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The Typewriter in the Schools.

BY "OBSERVER."

HANDWRITING is a lost art. If any one doubts the truth of this assertion, let him ask the Editor for a sight of the manuscript of this article; and I can assure the reader that I did my best.

The only thing which prevents the general use of the writing machine in the schools is the difference between the cost of it and the cost of a pen. Yet the day is assuredly coming when the typewriter will be a necessity instead of a luxury, and the up-to-date educationist would be well advised to take stock of the position at the present time.

It is not only in commercial life, using the epithet in its restricted sense, that the writing machine finds a place. It is to be found in the home of the doctor, the clergyman, the literary man, and the journalist; and the time is coming when ordinary home correspondence will be conducted with its aid. At one time a typed letter looked cold, formal, and in some cases even heartless. This feeling has now worn off, and a manuscript epistle is often a sheer weariness to the eye.

This change is nothing less than a great and far-reaching social movement. Yet it is taking place without the help or even the cognisance of the ordinary schools.

"What can we do?" I hear some one ask. "We cannot teach our pupils to use the typewriter for obvious reasons." My reply is twofold. 1. The schools can remove the reproach of the conductors of the commercial training institutions, now to be found in all our large towns, who complain bitterly that pupils come to them utterly unprepared to take up commercial life. 2. In some cases it is possible to make at least a beginning in teaching the use of the writing machine, which is fast superseding the pen.

A metropolitan proprietor of a business college has already been driven to establish schools for younger pupils, in order to prepare them for following a commercial course later in life with some degree of success and a minimum wastage of time and energy. This is a distinct reproach to us. At the present stage of our educational progress we ought to send to the business colleges pupils who are ready to absorb the technical knowledge required in a very short time. And at a later stage the ordinary schools ought so to work that the proprietary business colleges shall be unnecessary, except for students taking advanced subjects. I speak from some inside knowledge of metropolitan business life, as well as of educational work in various parts of the country. And I speak also of possibilities.

Teachers may reasonably ask me what kind of knowledge is necessary for students of typewriting. The actual manipulation of the machine is only one part of the work of a competent typist, and by no means the most difficult part. Where most students fall short is in their knowledge of the mother tongue. So that we soon arrive at a practical answer to the above question—namely, Teach your pupils to use their mother tongue in a proper manner, and concentrate upon the English of the present day.

Let any teacher interested in this subject run quickly through Morton's *Modern Typewriting*, a manual widely used in business colleges. He will find there much instruction which is necessary for a typist, though it has no connection with the mechanical manipulation of the machine—instruction which we can easily pigeonhole as "English," though it is not the English of the schools.

Now, in any school course in English careful attention could be paid to these points to the advantage of all pupils, whether intended for an industrial or a commercial career. It will do the ordinary pupil nothing but good to be instructed in the following matters, each and all of which are dealt with in the latest edition of the manual referred to:—

1. Punctuation. A matter indifferently attended to in most lessons on composition. The summary of rules given in Morton's manual is excellent from the point of view of practical utility.
2. Division of words at line ends.
3. Styles of type. This is a matter commonly dealt with in all American books on instruction in English.
4. The use of capitals. Very well summarised in Lesson X. in the above book.
5. Headings, salutations, and subscriptions of commercial letters.
6. Some of the simpler forms of business correspondence.
7. Applications for situations. Lesson XII. of Morton's manual is very good.
8. Postal information. Selected portions of Lessons XIII. and XIV.
9. The postage book: its arrangement and use.
10. Envelope-addressing.
11. Some simple system of card index.
12. The use of a carbon sheet.
13. Invoicing. This has been part of the arithmetic programme for a generation, but needs bringing up to date.
14. Duplicating. Most schools employ some method for printing off examination papers, but rarely is the process explained to upper standard pupils.
15. Spelling rules and formation of plurals. Excellently summarised in an appendix to Morton's manual.
16. Some of the more usual forms of address, as well as foreign words, phrases, and sayings, with their meanings.
17. A selection of the very complete list of abbreviations given at the end of the above-mentioned manual.

So much for the general work. No teacher will deny that all these points might receive attention in any ordinary scheme of work in English, even if the pupil leaves school absolutely and entirely ignorant of the ordinary parsing and analysis. The above matters are concerned with living English, the mother tongue as it is employed in the world of business, in which each and all of our pupils must find a place.

Next month I hope to deal with the matter of actual instruction in the use of the writing machine.

DEGREES FOR TEACHERS.—We need scarcely point out to our younger readers the advantage of possessing a university degree; and those who are on the look-out for postal tuition are recommended to apply to the National Correspondence College, South Kensington, S.W., for a prospectus of classes for matriculation which are now commencing. The arrangements, fees, and method of work compare favourably with those of other institutions of a similar character.

Some Emergencies of School Life.

BY J. P. O'HEA, F.R.C.S. (ENG.), M.B. (LOND.), MEDICAL OFFICER TO LONDON COUNTY SCHOOLS.

IT is unnecessary to dwell on the serious results to a school stricken by an epidemic of scarlet fever or measles. Every teacher knows that it is only by being ever on the watch that such a disaster can be averted. But it is not enough to be able to detect and promptly exclude a child on whom the rash of an infectious disease is already out; by that time much mischief will be done. We want to be able to detect these diseases in their very earliest stages, and to do this we must be well aware of certain signs which generally usher in the complaints in question.

First, then, as to **Scarlet Fever** or, as it is sometimes called, scarlatina. We will suppose that there is an epidemic in the district. What are the signs which should arouse grave suspicion? They are these—headache, sore throat, vomiting. Of course it is by no means an uncommon thing in a large school for a child to have a vomiting attack, but in times when scarlet fever is about it is a safe rule to be very suspicious of every case of sudden vomiting; and if there be complaint of sore throat as well, to look upon the case as presumably one of scarlet fever, and to exclude the child at once. Twenty-four hours will show whether or not we are right.

Measles is a very infectious disease, and some believe never more so than in the initial stage of catarrh, or "cold in the head," some days before the rash makes its appearance.

In times of epidemic it is very important, therefore, to be able to distinguish between this catarrhal stage of measles and the ordinary coryza, commonly known as a "cold in the head." A point which may be of great help in such cases is the presence of what are known as "Koplicks spots." They are to be found on the inside of the cheeks, and present the appearance of bluish-white elevations on a reddish background. They are often to be seen some days before the characteristic blotchy rash of measles shows on the face.

Fainting, however produced—and its exciting causes are many—is in its essence due to a weakly-acting heart which fails to keep the brain properly supplied with blood. The brain fails in its functions at once, and the muscles which keep the body erect (and which only act under the constant supply of nerve impulses reaching them from the central nervous system) become flaccid, and the sufferer sinks to the ground. Now this horizontal position is Nature's method of remedying the faulty blood supply to the brain, for now the weakly-acting heart can more easily send blood to the head. Therefore, in treating a case of fainting, copy Nature, and keep the head low. This is the first thing to do. Loosen tight clothing, open windows, bathe the face with cold water, hold smelling-salts to the nose if you like. All these are valuable; but the most important of all, the one essential thing, is the low position of the head.

Stunning, or concussion of the brain, is the name given to the symptoms following on a blow to the head, the injury not being severe enough to cause gross damage to the brain.

These symptoms are, first, loss of consciousness, which may be complete or only partial, in which case the patient may be slightly roused on speaking to him loudly. The pupils are inactive to light, and are, as a rule, moderately dilated, and, a point of importance in diagnosing the condition from the much more serious one of compression of the brain, are equal. The face is white, cold, and clammy; the pulse is feeble and slow—at any rate immediately after the injury—and the respiration is weak and shallow. After an interval of unconsciousness, which may be a few seconds or minutes or hours, the face becomes flushed, and consciousness returns, generally accompanied by vomiting. All head injuries are grave. Send for a surgeon at once. Meanwhile you may loosen the clothing, and turn the head to the left side, so that should vomiting occur, as it most likely will, there will not be any fear of the vomited matter finding its way into the air-passages. You may also apply hot-water bottles to the feet, but be sure that they are carefully wrapped in flannel firmly secured to the bottle, or a nasty burn may be the result. On no account give stimulants; in head injuries they only do harm. After consciousness has returned, keep the child lying down, and watch it carefully. If it shows signs of again becoming unconscious, there is probably hæmorrhage going on within the skull, exerting pressure on the brain, and the case is a very grave one. Only an immediate operation can save life.

For some time to come, even after cases of apparently slight concussion, it is highly advisable to let the child do as little brain work as possible.

Nose-Bleeding (*spontaneous*).—This is often in the nature of a safety-valve, and, unless copious, is not of serious import. If the bleeding be excessive, let the child lie down with the shoulders slightly raised, and the head turned to one side. Loosen tight clothing. Apply something cold to the back of the neck; a large door-key will do very well. This acts through the nervous system, and causes contraction of the blood-vessels in the mucous membrane of the nose, and for once the treatment recommended by our grandmothers has a physiological basis.

Do not let the child bend its head over a basin; such treatment kinks the veins of the neck, and, hindering the return of blood from the nose to the heart, tends to increase the hæmorrhage.

Do not let the child blow its nose, for this only tears away the clotted blood, which is Nature's method of sealing the ruptured vessels. And for the same reason do not follow the advice of the books, and syringe the nostrils with cold water. Theoretically, this should cause contraction of the blood-vessels; practically, it washes away the clots, and the bleeding recurs.

The arms should also be placed in an extended position beyond the head, and kept so supported. This expands the chest, and promotes the return of blood from the nose.

Impetigo Contagiosa is the name given to a very common and infectious disease of the skin. It is most commonly seen on the face, particularly in the neighbourhood of the mouth. Generally, the children are poorly nourished and debilitated. The affection presents the appearance of yellowish blisters, which stand above the level of the skin, and almost look as if they had been stuck on. After some days the blisters change into scabs, which finally come away, leaving the skin free from scar and only slightly discoloured.

This discoloration entirely disappears eventually, and the skin resumes its normal appearance. It is a wise thing to at once exclude such cases, or, infecting the school towels, the disease will promptly spread to the other children.

An ointment of equal parts of boracic acid and white precipitate ointments is quite efficacious, and a tonic treatment is also indicated.

Ringworm is a fungus disease, and affects the scalp and body. On the body it can be readily cured by the application of tincture of iodine, white precipitate ointment, or even Stephen's ink.

On the scalp the disease shows itself as a bald, slightly-raised, pinkish patch, covered with branny scales. It often itches, and the hairs on the patch are broken or bent, and if gently pulled upon come away readily, for the fungus has invaded their roots and loosened their attachment to the scalp. As for treatment, there is no doubt that the most efficient and quickest in the end is the modern treatment by the Röntgen rays.

Foreign Bodies in the Eye.—This is a very common occurrence, as everybody knows, and it would be well if every one would learn the way to deal with it. The matter is really very simple if we only set about in the right way. Let the child be seated and facing a good light, and direct it to look downwards, keeping the head erect meanwhile. Stand behind the child, and pull down the lower lid to see whether the foreign body be there. If nothing is seen here, and there is nothing imbedded on the clear portion of the front of the eye (the cornea), then the upper lid must be everted. Slide the tip of the little finger of one hand downwards over the upper lid, and with the index finger and thumb of the other hand take hold of the eyelashes of the upper lid and turn it upwards over the little finger. This will turn the lid inside out, and the foreign body can be removed with the moistened corner of a handkerchief. Then instil a little castor oil or olive oil, and tie up the eye for some hours with a pad of wool and a bandage. This gives great relief, as it prevents the continual rubbing of the eyelid on the damaged surface of the eye, which occurs in the oft-repeated act of blinking. If the foreign body is imbedded in the cornea, leave it for the surgeon to tackle. Simply tie the eye up.

N.U.T. NOTES.

BY ALLEN CROFT.

THE publication of school reports is one of those practices which prolonged consideration impels me to state has little to recommend it, and, on the other hand, may be fraught with possibilities of grave mischief. During the past few days a press cutting has been placed in my hands containing four or five such reports, all including reflections of some description, and one containing the sentence: "The children have been allowed to forget much of the work they have learnt in past years, and this is a serious defect in the school." Can *any one* see the benefit to be derived from promulgating such an expression. One can easily see the damage possible to a hard-working teacher's professional reputation, which is bound to have an unfavourable influence on the school. I have heard it alleged that school reports are public documents, and therefore *ought* to be accessible to newspaper readers. It is perhaps a sufficient reply to point out that none of the great newspapers, either metropolitan or provincial, would ever dream of publishing school reports. Such procedure is invariably limited to local newspapers of a more or less obscure character; and the more unfavourable the report, the greater are the opportunities for village tattle. Once an official of a Local Education Authority gravely assured me that publication was a solace to the successful teacher, and ought to provide a stimulus to the "slacker!" One lives and learns, undoubtedly! Personally, I object to publication *in toto;* and one great reason is because the comparison of reports of different schools is, as a rule, so flagrantly unfair. Some schools are happily enabled to work all the year round under most favourable conditions. Others are handicapped in every possible way, and their unfortunate teachers have the final mortification of seeing their professional reputation called in question by the people amongst whom they live and labour.

Publication of School Reports.

* * *

LATELY I have been perusing the second annual report of Sir George Newman, the Chief Medical Officer of the Board of Education, and a valuable and encouraging document it is, in spite of the inclusion of paragraphs like the following: "It may, however, be stated generally that, in respect to the six million children in the public elementary schools of England and Wales, about 10 per cent. of them suffer from serious defect in vision; from 3 to 5 per cent. suffer from defective hearing; 1 to 3 per cent. have suppurating ears; 8 per cent. have adenoids or enlarged tonsils, of sufficient degree to obstruct the nose or throat and to require surgical treatment; 20 to 40 per cent. suffer from extensive and injurious decay of the teeth; 40 per cent. have unclean heads; about 1 per cent. suffer from ringworm; 1 per cent. are affected with tuberculosis of readily recognisable form; and ½ to 2 per cent. are afflicted with heart disease. It is to be feared that in the aggregate this formidable category of disease and defect means a large degree of suffering, incapacity, and inefficiency." "The Part taken by Teachers" forms the subject of several most interesting paragraphs; and although Dr. Newman, like the ordinary official, is economical with his praise, he is driven by hard facts to write: "Repeatedly, however, school medical officers testify to the willing and valuable co-operation of the teachers, and several of them quote instances to show what transformation has been brought about, especially in regard to cleanliness and the general appearance of the children, by the united action of doctor and teacher." I am not sure that this sentence does not prove too much; but I won't discuss it here. Dr. Thresh, County Medical Officer of Essex, sums up the position thus: "The head teacher is, in my opinion, the dominant factor in the situation. Medical inspection may do much, but the teachers can do more." I have looked in vain for some expression of opinion from Sir George Newman as to the part that teachers should *not* take in medical inspection. Perhaps we shall have it next year. It is, however, an undoubted and deplorable fact that in certain localities teachers have been required to undertake duties which can only be adequately performed by a qualified medical man.

Medical Inspection.

French Prize Competition.

1. All French translations must be received not later than February 7, 1911, and addressed to:—PRIZE EDITOR, Office of *The Practical Teacher*, 35 and 36 Paternoster Row, London, E.C.
2. Competitors should cut out and send the *coupon* which appears on the Back Wrapper page of the current number. One coupon must be sent for each entry.
3. Competitors should write pseudonym only on MS. Prize-winner will be asked to send name and address for publication.
4. No competitor may take the prize offered more than once in three months.

A Prize of Half a Guinea is offered for the best rendering into English of the following extract:—

C'est de cette belle, grave, noble et aimable ville d'Oxford que je veux, chère amie, répondre à votre lettre du 4 mars, et vous remercier des soins que vous avez donnés, avec votre affection accoutumée, à ma lettre pour Rome. Je suis arrivé hier soir ici, seul et tout à fait perdu, mais avec une joie d'enfant de trouver une ville sans fumée et sans bruit, toute pleine de monuments littéraires, les uns gothiques, les autres de style moderne, et avec une incroyable profusion de cours et de portiques silencieux où passent çà et là de jeunes étudiants avec une toque et une petite toge très originale. Je me promène avec ravissement dans ces rues calmes, dans ces belles allées d'arbres qui bordent deux rivières, et je ne me rappelle pas avoir rien vu qui m'ait produit une assez douce impression. Je conçois que toute cette jeunesse élevée là n'en perde jamais la mémoire et y revienne avec une affection que le temps ne fait qu'accroître. Nous n'avons rien de semblable en France; l'université est pour nous un collège, c'est-à-dire quatre murs avec cinq ou six professeurs et autant de maîtres d'études. Ici, l'université est un monde et un monde charmant. Tous ces collèges ont leur porte toute grande ouverte, et l'étranger y pénètre comme dans un asile qui appartient à quiconque aime le parfum des lettres et du beau. Chacun de ces collèges est vaste, mais pas trop habité; la solitude ajoute à leur grandeur. Presque tous, les églises et les autres monuments avec eux, ont un cachet de vétusté incroyable; les colonnes noires sont sillonnées par des traces blanches que le temps a creusées dans la pierre, et il semble que tout cela va tomber tout à l'heure. C'est à la fois l'image et la forteresse de l'Eglise anglicane.

From the Letters of PÈRE LACORDAIRE.

RESULT OF THE JANUARY COMPETITION.

The prize is awarded to "Paul." (Will "Paul" kindly forward name and address for insertion in our next number?)

First Class.—Dash, Kettering, François, Villon, Crocus, Tanguy, Hialmar, Bérénice, Sapphire, Voltaireo, Coppertop, Unaided, Penelope, Nichola, Ouistreham, Abeille, Margaret, Empiricus.

Second Class.—Elba, Pierre Morin, Twirne, Dim, Karrotts, Westminsterian, Solitaire, Michael, Sirius, Le jeune écolier, Heathfield, Isomorphism, Viking, Rochdale, Tatania.

REPORT.

An elementary acquaintance with the historical allusions contained in the extract set was necessary if a candidate was to send in a satisfactory translation. This appeared to be lacking on the part of most of the candidates who figure in the lower part of the list. The inversion in *qu'avait enfanté 89* was a puzzle to some, and the distinctive meanings in the extract of *rapports* and *aussi* escaped others. *S'asseoir au foyer britannique* appeared in one translation, otherwise a good one, as "sent himself at the British hearth-rug."

PRIZE TRANSLATION.

Who would believe that what first inclined me to oppose the consular government was the borrowing from Rome and from Greece of the names given at first to the new offices, and later on to the public educational establishments! Consuls, tribunes, prefects, prytaneums, lyceums—all these words seemed to me to clash with the new world brought forth by the year '89, which had bequeathed to us quite enough words of similar origin. It was childishness on my part, no doubt, but I have always detested this blind imitation of the ancients. Amongst us, look at Hérault de Séchelles unable to start work upon our constitution unless first of all he could get hold of the laws of Minos. From the mixture that we made of ancient and modern, of paganism and Christianity, was born a civilisation of bits and scraps, the dress of a harlequin which, happily, is beginning to fall into rags. My anger on this subject created laughter at the time, and will perhaps do so again to-day. That has not prevented me, in spite of my love for the Greeks, from taking a dislike to the great men of Plutarch and to Plutarch himself, this Greek who dares not appreciate either the political grandeur of Demosthenes or the genius of Aristophanes. Let us study antiquity, let us respect tradition, but let us borrow from them only what we cannot do without. My admiration for Bonaparte has not prevented me from styling him often a pedant. Paoli read him aright: he was in many respects one of Plutarch's heroes; and so he will remain, I hope, the last and perhaps the greatest of the men of the old world that he loved to remodel, albeit after a fashion of his own. Alas! nothing brings misfortune like struggling against a new world. Napoleon succumbed to the task. In 1815, justifying the words of Paoli, he wrote to the English regent that he was coming, like Themistocles, to sit at the British hearth. The English people and their prince were greatly touched by this remembrance of Plutarch.

"PAUL."

A UNIQUE FRENCH DICTIONARY.

MESSRS. LONGMANS have just issued a thoroughly revised and enlarged edition of Bellows's *French-English and English-French Dictionary*. The distinguishing features are the printing of feminine genders in italic type, the indication of the *liaison* by sign, the arrangement of both the French-English and the English-French divisions concurrently on the same page, the manner of arranging the verb conjugations, and the reference by numbers to such conjugations from the text of the dictionary. Throughout each page the work is extremely full and helpful, and such care has been shown in the use of different types that one refers to and reads a page of this dictionary with real pleasure. Another feature is the special attention paid to the figurative meaning of words wherever possible. Students and readers of French will appreciate this evidence of research at its right value. The references from the French to the English and *vice versâ* on the same page are also a most valuable aid.

We have compared this volume with other dictionaries, with the result that we can strongly recommend it.

LANGUAGES AT THE PRELIMINARY CERTIFICATE EXAMINATION.

SIR,—The following letter received from the Board of Education will clear up a somewhat doubtful point in the 1911 Preliminary Certificate Syllabus. It follows from the accompanying letter that, although distinctions may be gained in two languages, yet the marks for one only will be of use in assisting candidates to pass the examination.—Yours faithfully, P. LYDDON-ROBERTS, and E. E. DENNEY, Principals, Normal Correspondence College.

"Board of Education.

"SIR,—In reply to your letter of the 22nd inst., I am directed to state that a candidate who takes two languages at Part II. of the Preliminary Examination for the Certificate 1911 will not have the marks for more than one of them included in his aggregate marks.—Your obedient servant, R. G. MAYOR."

Papers for Teachers of Infants.

A TALE FOR THE STORY HOUR.

SELIMA.

A Persian Fairy Story.

BY MARIE BAYNE.

THERE lived long ago on the banks of the river Tigris a poor widow named Nouri.

Her husband had been a camel-driver. He used to go with the caravans of the silk merchants from Bagdad to the sea; and one day he had been killed in the desert by some Arab thieves.

The camel-driver left one daughter, named Selima, and this child was the only comfort of her widowed mother.

Little Selima was very beautiful. Her eyes were a deep soft black, her cheeks rosy as a pomegranate flower, and her hair was so long that it fell almost to her feet. The neighbours declared that there was not in Persia a fairer maid.

The widow Nouri earned a living by rearing silkworms. Her garden was planted with mulberry trees, and all day she fed the worms on mulberry leaves, so that they should wind the soft cocoons of silk around their bodies. This silk she afterwards unwound and prepared for weaving.

Her mother being so busy, Selima was much alone; but one day a little old woman knocked at their door, and begged for food and shelter.

The widow had barely enough for herself and her child, yet her heart was kind. Bidding the old woman enter, she went to the well to fetch water; and when she returned she found that Selima of her own accord had shared her supper with the stranger.

From that hour the little old woman became an inmate of the widow's cottage.

"You shall tend your silkworms," she said to Nouri, "and I will perform the household tasks and instruct this beautiful child."

With this proposal the widow Nouri was content, for she knew her daughter was in sore need of a teacher. Good luck, too, seemed to follow the coming of their guest. Her silk fetched a better price in the markets, so that she was able now and again to buy a new sash for Selima; and there was no longer any bitter want in their home.

Meanwhile the little old woman taught Selima many things—how to wind the silk, how to cook the food, how to wash and dress the brightly-dyed clothes they wore. But, best of all, she taught her to be kind and gentle and unselfish.

"Always choose the good, Light-of-my-eyes," she said, "and resist the evil. Remember that true friends never utter evil counsels."

At the end of each day she gave Selima a peppercorn.

"But why do you give me these?" asked the child, in wonder.

"So that you may not forget my words," said her teacher.

She made Selima put the peppercorns in a red silk bag. This little bag had golden cords and tassels, and Selima loved it because it was so pretty.

"Now," said her teacher, "every day you must count your peppercorns, and try to recall the lessons I have taught; and should you ever be in danger, just drop one on the ground, and help will come to you."

These words seemed strange to Selima; but what happened next was stranger still, for the little old woman disappeared.

One morning when they rose she was nowhere to be seen. Nouri searched the house, and Selima searched the garden. She peeped behind and beneath every mulberry bush, but found no trace of her friend.

In vain the child wept and mourned for her; the old woman did not return. All Selima could do was to try to follow her teaching. Each morning she counted her peppercorns, and recalled the lessons she had learned; and by degrees the wise words sank into her heart, so that she grew up as good and pure as she was beautiful.

But one sad day the widow Nouri died, and Selima was left quite alone.

Long she sat and wept in her little cottage. She forgot to tend the mulberry trees; she forgot to feed the silkworms; she even forgot to eat and drink, so sorrowful was she; and at last she could bear her lonely life no more.

"I will set out," she said to herself, "and seek my beloved teacher. It may be I shall find her again in the wide, wide world!"

So Selima hid her red silk bag in her bosom, locked the door of her house, and set out on her quest.

She went first through a deep, dark wood. At nightfall she could hear the cries of savage beasts and birds, and her heart was full of terrors.

By-and-by she espied a band of robbers riding towards her. They carried torches, and each man wore a long, sharp knife by his side.

"By the beard of the prophet," cried one, catching sight of her, "here is a pretty prize! Let us capture the maiden and sell her as a slave at Bagdad!"

When poor Selima heard these words she almost fainted with fear, and had barely strength to fumble for a peppercorn. But as soon as she had found one and dropped it on the ground, she changed into a little dormouse, and crept thankfully into a hole in a cypress tree.

When the robbers came up she was nowhere to be seen. The little dormouse, peeping from her hole, saw them seeking her everywhere; and at length, in a great rage, they galloped away.

After that Selima fell asleep, as a dormouse should; but at sunrise she woke, crept out into the light, and lo! she was a beautiful maiden once more.

On and on she wandered. One day at noon, feeling very weary, she lay down by a running brook to rest. Soon she became drowsy, and would have slept had not a footstep roused her.

Starting up, Selima found a beautiful damsel by her side. Her face was like the bright narcissus flower, her robe was azure blue, and her bare feet were white as ivory.

"Pretty pilgrim," said this damsel, "why should you wander farther? Follow me, and you shall be happy for evermore!"

But Selima shook her head.

"Nay," she cried, "I may not tarry, for I seek a friend."

"And I," said the damsel, "come to lead you to her. The friend you seek is one of the genii of this forest, and she has sent me forth to summon you."

Selima was overjoyed to hear these tidings, and followed eagerly. Yet as they went on she felt more and more uneasy, for her companion laughed and jeered at every virtue she had been taught to love.

"Why should we be good?" cried the damsel lightly; "nothing matters in this life but that we should be merry and gay."

At first Selima was shocked at such words; but after a while she began to listen and even to smile.

"Is she not a friend of my friend!" she whispered to herself in excuse.

At length they came to a river grotto, and here Selima found many maidens as lovely as her guide. Some were dancing, some were eating and drinking; but all were making a jest of goodness and truth.

At the sound of their laughter Selima drew back.

"Where is my friend?" she cried anxiously.

"Little Simpleton!" they answered; "we did but fool you! We have no hermits here. Come, feast with us and forget."

They tried to draw Selima forward, but all at once a great fear fell upon her. Snatching forth a peppercorn she dropped it on the ground; and, behold, all the dazzling creatures turned to hissing snakes and crawling worms.

Then Selima fled, for she knew that these must have been the evil genii of the forest. Too late she remembered the little old woman's warning that good friends never utter evil counsels.

For many months she wandered on her quest, till her clothes were torn and her heart was heavy; but at last the domes and minarets of Bagdad appeared in the distance. Footsore and weary, Selima entered the city. "It may be I shall find her here!" she sighed.

Now it chanced that the Caliph Hassan rode that day through Bagdad. In his train was the Grand Vizier Horam, the wisest man in Persia.

Selima, peeping through her tattered veil, watched this man with a strange wonder. "Where," thought she, "have I seen those kind eyes before?"

That night in her poor lodging she could not sleep for thinking of the vizier's face; and how great was her surprise when he sought her out next morning!

"Light-of-my-eyes," said he, "you are weary and worn; but all your griefs are ended."

As he spoke the vizier's grand robes faded from him, and lo! before her Selima saw the little old woman she had sought so long.

"I am one of the good genii of Persia," she explained, "and long in disguise have I served my royal master. Long, too, have I watched over you, Selima; but now I have proved you, and know you worthy to be the wife of the Caliph Hassan."

Then Selima knelt at the little old woman's feet.

"Do with me as you will," she whispered softly.

So the very next day Selima, the camel-driver's daughter, became the wife of the Caliph Hassan.

"Mother-Craft."

A REVIEW OF THE MEMORANDUM ON THE TEACHING OF INFANT CARE AND MANAGEMENT ISSUED BY THE BOARD OF EDUCATION.

BY CLARA E. GRANT.

ONE of the most curious and significant features of modern education is seen in the tendency to come back to the simple essentials of life as a starting-point. Too long have we regarded the school as a thing apart—an institution in which much that we fondly believed it was necessary to "learn" could be learned which could not be acquired in the home, but which had no vital relation with the home, with life, or with duty, and too much of which was all too soon forgotten, in literal accordance with the old bad idea of "finishing one's education." Fortunately, we are now beginning to realise that "school education" is only an initial, though an important, step in the training for life and its responsibilities; and much in this modern conception of education (which should really be as old as humanity itself) is due to the enormous body of efforts now being made for the amelioration of social conditions amongst our poorest children.

For too long these efforts, again, were divorced from the school, and even from the home in many cases, until finally the physical condition of children actually in school forced itself upon the authorities, and efforts are at last being made to weave physical and social regeneration into our very conception of education—to study causes as well as effects, and in so doing to hark back to the beginnings of things. Even the minimum age at which children may enter school—three years—has been proved to be too late for "education" to begin, and so we revert once more to literal infancy and motherhood as the basis, and to the need of ensuring that, whatever may be the limitations of the present "mothers" of England, at any rate we will try to secure an efficient race for future parentage, and, as one practical result of this plea, comes the very opportune *Memorandum on Infant Care*, recently issued by the Board of Education.

I. GENERAL.

This *Memorandum*, written by Dr. Janet Campbell of the Board's Medical Department, represents one of the most valuable and interesting of a series of propaganda pamphlets issued by the Board. In a sympathetic Prefatory Note Sir Robert Morant emphasises the important truth that "education is concerned with the bodies as well as the minds of the scholars," and that "a practical knowledge of the common conditions which affect health and physical efficiency is as necessary a part of the purposes of a school education as intellectual attainment."

With its usual sympathetic attitude towards individual freedom in making experiments, the Board trusts that the pamphlet may not only rouse interest amongst those not yet alive to the importance of the subject, but also

provide guidance and direction to "the many devoted workers" already in the field.

In the introductory statement Dr. Campbell points out the significance of infant mortality and the perhaps greater tragedy of the survival of the weak and maimed who must remain woefully handicapped through life. The dangerous tendency of mothers to accept certain infantile diseases as a matter of course is dwelt upon, and the need for some general training in simple home nursing when illness comes, and in personal hygiene which may often either prevent or ameliorate the ravages of disease. Dr. Campbell points out the value of breast-feeding over artificial foods, especially in its relation to diseases—for example, summer diarrhœa—and we may remember here the statement recently made by a London doctor that of twenty deaths occurring through infantile diarrhœa, nineteen cases will be those of infants artificially fed. It is fair to remember, however, that very poor mothers are just those who usually fulfil this maternal function faithfully, though they suffer more than any class from lack of extra and even necessary nourishment during the pre-natal and nursing periods.

II. THE PRESENT TEACHING OF INFANT CARE.

The second part of the *Memorandum* deals with the various methods adopted already. The plan by which a few lessons on the care of infants are included in the ordinary course of domestic or housewifery teaching is felt to be inadequate, apt to be confined too closely to a circumscribed syllabus, and to be limited to too small a number of girls. The Board rightly feels that every girl should receive this valuable training in view of the universal character of her potential function of wife and mother.

(*a*) *Separate Courses.*—Short courses given by visiting teachers, occasionally by nurses, are not felt by the Board to be quite satisfactory, being often "relatively superficial," too technical, and given at long or irregular intervals.

(*b*) *Correlated Schemes within the School Curriculum.*—A few instances are quoted of schools where specially enthusiastic teachers have organised regular schemes of "mother-craft" within the school, the simplest apparatus and illustrations being used, and the teaching correlated with kindred subjects—for example, needlework, hygiene, temperance, cooking, home nursing, and domestic arithmetic. One wonders, in passing, why "domestic arithmetic" should not be almost entirely the basis of all arithmetical work in girls' schools, when one thinks of the many interesting and acutely mathematical problems involved and their valuable application to everyday life and needs.

(*c*) *The Crèche as a Teaching Centre.*—Various plans are discussed for utilising the day nursery, where such exists, as a teaching centre in infant care. Girls receive their theoretical instruction in the ordinary school and their practical training at a crèche in the neighbourhood, in some cases under the matron, in others under the class teacher. In one case a classroom is converted into a nursery for the time being, and the girls bring young children to tend, though hitherto it has been found impossible to import babies for the purpose.

III. GENERAL DEDUCTIONS AND PRINCIPLES.

From a careful study of experiments and suggestions already available the Board draw some valuable general deductions—for example, the futility of isolated lessons or courses, the absolute need for a complete unified scheme of training in all that pertains to "mother-craft"—namely, personal hygiene, home management, infant care, home nursing, etc., viewed as a whole and "built in a homely way upon a broad foundation of elementary facts well within the range of knowledge of the girl." Formal lessons on hygiene are rightly deemed undesirable for children under seven, though we presume the Board would agree that the *practice* of certain important physical habits can well be begun at an early age, and even, we think, their meaning crystallised into homely little aphorisms which, learned at an age when impressions are strong, will often cling to the memory and produce fruit in later years. Lessons in infant care, too, are deemed unsuitable for children under twelve, and should be given even later, if possible, so long as a sufficiently lengthy course can be arranged—say for one or two years.

Thirdly, the Board emphasises the need for *practical* teaching of infant care as "a practical, homely, applied science," the test of success being "not an examination in book-learning, but a healthy way of life, practical housewifery, and sensible motherhood."

IV. A SUGGESTED COURSE.

The *Memorandum* then proceeds to outline valuable courses for children of from seven to twelve, and twelve to fourteen, such courses being "suggestive" only, with the Board's usual desire not to impose stereotyped or crystallised schemes upon all types of schools and neighbourhoods. It is interesting to note here a most healthy feature of modern elementary education—namely, that, with all its highly organised teaching and inspectorial force, there is perhaps now no type of school which is so really "free" to originate individual ideals and schemes as the elementary school; and where such freedom is not found to be exemplified in practice, it is usually where the teacher is "afraid to plunge" or possibly lacking in initiative force; and to these the Board offers its many valuable publications as stimulating and directing aids rather than as official rulings.

V. GENERAL ARRANGEMENTS.

(*a*) *The Teacher.*—Dr. Campbell wisely points out the superiority of the class mistress over the visiting teacher for a subject so intimately connected with the girls' everyday life and needs, and demanding, perhaps above all others, the personal touch. "The subject is by no means an easy one, and calls, in any case, for high qualities of mind and heart." The class teacher is more in touch with her girls, often knows their homes, and is able to correlate her domestic teaching with the other school subjects, and these advantages more than counterbalance a possible inferiority in technical knowledge and skill. Always it is the functional rather than the intrinsic that matters.

(*b*) *General Method.*—Talks on method, the girls taking their own notes, are recommended rather than text-books, and the simplest language should be used: for example, the preparation of cows' milk for infants by adding water, sugar, etc., is far more important than technical teaching about *casein* or *proteid*.

The live baby is recommended rather than the large doll so often used, as being at once more real, and making a higher appeal to the girls' feelings and interest.

On the other hand, the difficulty of procuring an accommodating baby is not overlooked.

(c) *The Place for Instruction in Infant Care.*—The relative advantages of special "centres" and of the ordinary classroom are carefully studied—the latter involving certain practical difficulties (though occasionally successfully overcome), and the former tending to give the control too largely into the hands of the matron or nurse in charge. It is therefore carefully laid down that, in any case, the training must be brought into as close a relation as possible with the school. This point, we may remark here, is one receiving careful attention from the London County Council in connection with its cookery, laundry, and housewifery centres.

For ourselves, though speaking with a certain amount of diffidence due to lack of actual experience, we would venture to ask whether the whole system of "centres" could not better be concentrated into an ordinary working-man's cottage or "dwelling," exactly similar to the homes of the girls, as is done, we believe, in one or two towns in England. A double-floored cottage—for example, in some parts of London, a pair of adjacent "flats" in another—could be made to provide an ordinary working home with real tenants, say a widow and baby or small family, and a second home inhabited, say, by teachers representing perhaps a slightly different type of social life, more akin to the private "places" to which girls would go as servants; and in these the ordinary everyday routine of domestic life, infant care, home nursing, cookery, and laundry work would be practised under trained guidance, and the possibilities of small kitchens, smaller sculleries, backyards, etc., and neighbourly relationships could be exemplified in the midst of the homes themselves. The usual elaborate cookery centre, with its rich resources in the way of space, culinary apparatus, and material, strikes one as so remote from the lives of the actual homes as to provide little point of contact, and to accentuate the already sharp line of demarcation between school and home life.

Actual experience of cottage life has opened our eyes to countless small problems of everyday management, which are really great in their relation to life, health, and economy, but which could scarcely strike one in a large, elaborately furnished "centre." We should like to see this experiment tried in a simple, actual way in a cottage near a London school in a poor district, every aspect being studied—heating, lighting, sanitation, colouring and papering, the relations and mutual obligations existing between, for example, landlord and tenant, neighbour and neighbour, householders and local authorities, etc. Surely a large number of such simple "homes" attached to groups of two or three schools at the most would be as cheap as the present expensive detached cookery, laundry, and housewifery centres.

Another beneficent institution in very poor districts would be a small crèche for a few children under three; not large crèches such as would help to make it easy for mothers to go out to work—that disastrous policy—but where a very few children needing special care could be tended. The second and third years of life are often the most critical, yet babies often escape supervision at this stage when the health visitor has ceased to visit and the school observation has not yet begun. Such a nursery would provide at once a valuable training-ground for our girls, and an educative centre for social work amongst the mothers of the whole neighbourhood. Such a centre must be small and as homely as possible, and worked on strictly personal, natural lines, approximating as far as possible to the life around, but raising its possibilities to the highest possible plane.

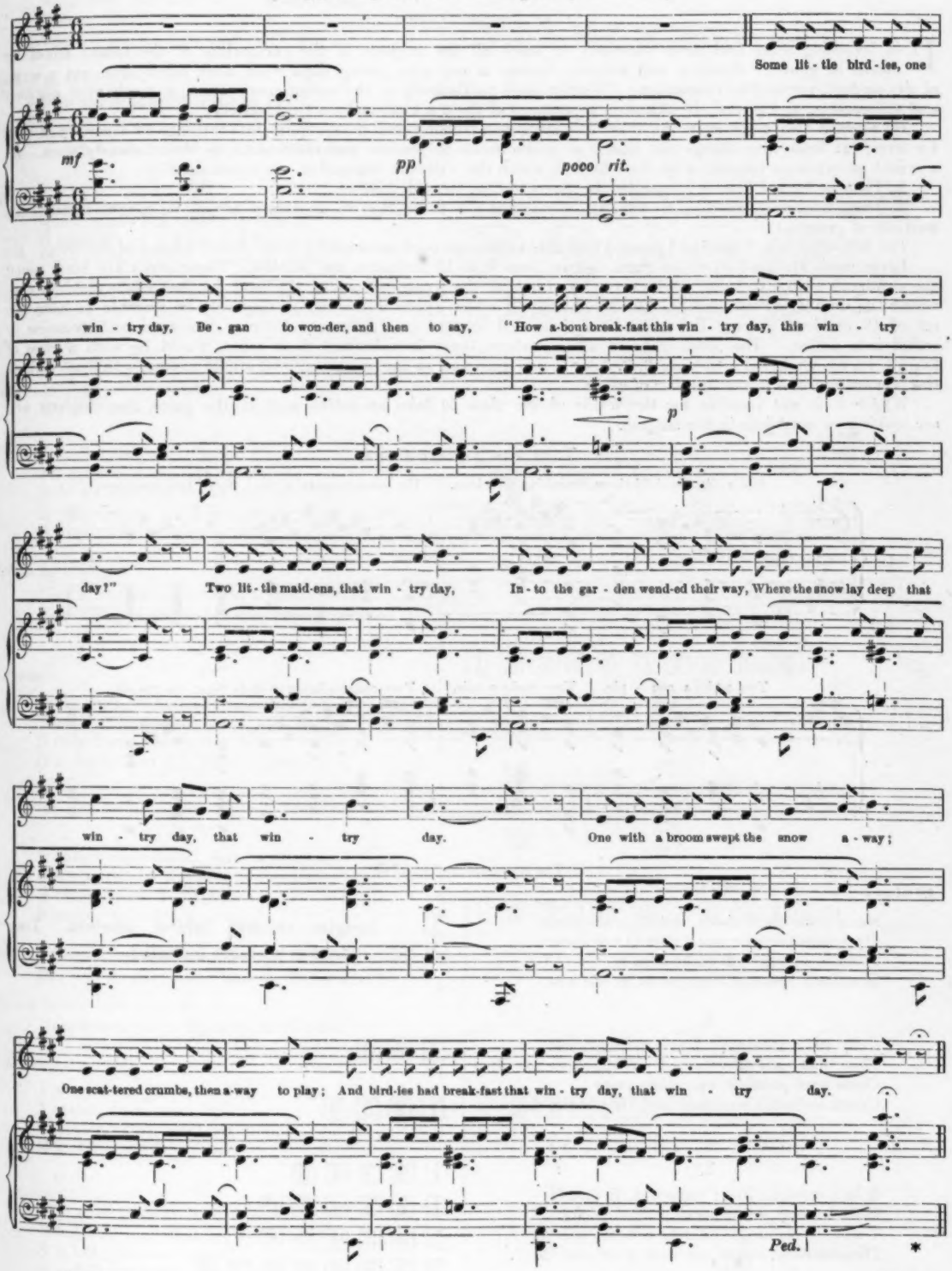
Domestic training of this kind would be, of course (as the *Memorandum* rightly points out), infinitely more effective were the girls older, and a strong plea is made for teaching of this kind in continuation schools. A higher "leaving age" might provide the opportunity for continuous courses in home-craft and infant care before the girls leave school; whilst some system of shorter hours of employment and compulsory continuation schools should enable us to strengthen and render permanent the influences which at present are scarcely felt by the girl leaving school before they become things of the past. Such teaching, concerned as it is with just those things in which the feminine mind is instinctively interested, would have an effect in developing the character and potentialities of our girls such as no other subject could possibly produce, and especially, as Dr. Campbell points out, amongst girls dull and backward in their ordinary lessons; and the "dull and backward," be it remembered, are as likely to be mothers as the brilliant scholars, who seem to lose so much of their brilliance as soon as they leave school.

The importance of dignifying the sacred calling of motherhood cannot be overestimated in an age when maternity is fast becoming a lost art, or at best, in the eyes of too many, regarded as a regrettable necessity. It is obvious too that, unless strong efforts are made to arrest the prevalent physical degeneracy and produce in the near future a strong race of parents, the degeneracy will become cumulative, until one dares not contemplate the national result. There is nothing in the teaching of home-craft which would not be valuable as a means of general training even for ordinary business or professional vocations; whilst the instinct for motherhood, once seized, developed, and dignified into a noble aim and ideal, should lead to the production of a race of mothers worthy of our nation and of its traditions. High ideals of home life and of motherhood amongst our girls (and some corresponding teaching of certain valuable "home" lessons to our boys) would result in a higher standard of labour, of social habits, and of character amongst those classes of the community which are numerically the largest, and, as such, bound to wield, as the years roll on, a growing influence in determining national policy and destiny. The home life of England has been one great factor in her national progress and prestige; yet never, perhaps, in her history has it been in greater danger than now. The Board of Education, taking a large view of its duties and its power for influence, has called the attention of all educationists to a great opportunity, and we hope its wise words will receive the attention they so richly deserve.

FOR STUDENTS OF PHYSICS.—Science teachers and students, as well as all who are interested in technical subjects, would do well to write to Messrs. Charles Griffin and Co., Exeter Street, Strand, for their latest catalogue, which contains full descriptions of a large number of interesting books, including the four-volume series on physics from the pen of Dr. R. Wallace Stewart, the first part of which, dealing with *General Physics*, is now ready. We hope to offer a review of this general survey of the subject in an early number.

"BIRDIES' BREAKFAST."

Words ANON. *Music by* THOS. J. HEWITT.

(Song for Infants, with a compass of six notes.)

Some lit - tle bird - ies, one
mf
pp
poco rit.
win - try day, Be - gan to won-der, and then to say, "How a-bout break-fast this win - try day, this win - try
p
day?" Two lit - tle maid-ens, that win - try day, In - to the gar - den wend-ed their way, Where the snow lay deep that
win - try day, that win - try day. One with a broom swept the snow a - way;
One scat-tered crumbe, then a-way to play; And bird-ies had break-fast that win - try day, that win - try day.
Ped.

"Number" Up-to-date.

BY NETTIE CAMPBELL.

IT is becoming more and more necessary to teach all the subjects in the curriculum of the infant school by means of games. Reading and number lessons in our own young days were more often than not a series of dry-as-dust, parrot-like reiterations. I refer more particularly to the monotonous counting, mechanical addition and subtraction, and dismal simultaneous repetitions of the **c a t** cat and **r a t** rat variety.

By modern treatment even the three R's are being transformed, if not quite into "things of beauty and joys for ever," at least into things not nearly so monotonous to teacher and child alike as they formerly were. At a recent government inspection at the school in which the writer is engaged it was recommended:—

1. That no formal lessons in number be given to five-year-old children.

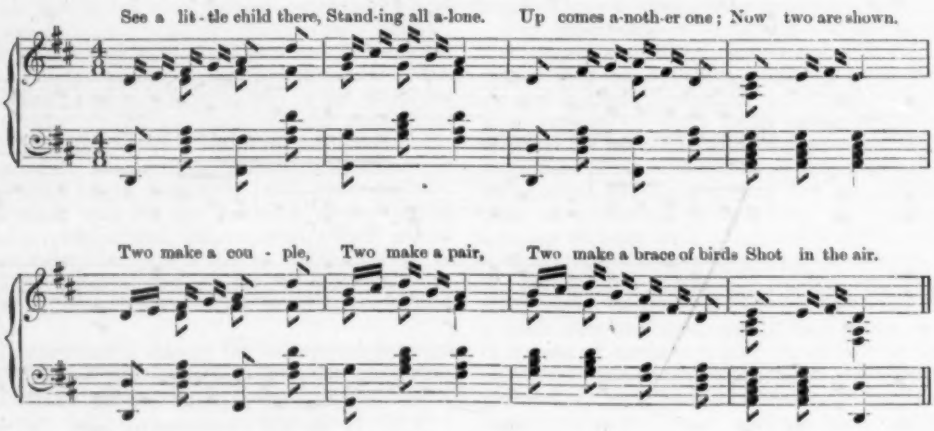
2. That, wherever possible, all subjects (including the three R's) in an infant school be taught through the medium of games.

The following is a "number" game which the writer has used successfully with several classes of children.

Large cards are used on which giant figures, from 1 to 10 inclusive, are painted. These cards are hung round the children's necks, it being advisable to have one at the front and one at the back, so that when children turn round the number is still visible. In small schools, where space is limited, it may only be possible to have one set of 10 children playing the game at a time, and in that case different children should on each occasion be called into action. The ideal state of affairs, where there is unlimited floor space, would be with a class of 20, 30, 40, or 50 children to have 2, 3, 4, or 5 sets going on at the same time. This, of course, would necessitate the preparation of a larger number of cards.

Where it is not possible for the whole of the class to take an active part in the game, the children who are looking on must join in the singing.

Tune for Number Game.


See a lit - tle child there, Stand-ing all a-lone. Up comes a-noth-er one; Now two are shown.
Two make a cou - ple, Two make a pair, Two make a brace of birds Shot in the air.

Decomposition of 10.

All sing:—

1.

See a little child there, standing all alone.
Up comes another one; now 2 are shown.
2 make a couple, 2 make a pair,
2 make a brace of birds, shot in the air.

2.

Jolly little children—here's another, see.
How many are there now? Why, there are 3.
Come here another, one other more;
Count them all together, and they make 4.

3.

4 in a straight line; come out, 5 and 6—
Half a dozen wee ones all full of tricks.
7 now is running—he does not wait;
Then another makes our sum grow into 8.

[1] Imagine children behind numbers. They
[1] [2] stand in positions indicated.

[1] [2] [3]

[1] [2] [3] [4]

[1] [2] [3] [4] [5]
[1] [2] [3] [4] [5] [6]
[1] [2] [3] [4] [5] [6] [7]
[1] [2] [3] [4] [5] [6] [7] [8]

4.

8 clever children; don't they look fine?
What does the next make? 9 in a line.
Then to the 9 add 1 on again:
What is our number now? 10, 10, 10.

Spoken by child:—

How many 2's are there in 10?

Spoken by children in game:—

Watch what we do! you'll know then.

All sing:— 5.

Quick, little 10, break up into 2's!
5 little 2's in 10 pairs of shoes.
Drop hands quickly, join in a chain!
Now you can see we've 10 ones again.

Spoken by child:—

How many 5's are there in 10?

Spoken by children in game:—

We will show you; watch again!

All sing:— 6.

10 little soldiers, 10 little lives,
Now we shall show you how many 5's.
2 little rings with 5 in a ring;
2 fives make 10, hear us sing.

Spoken by child:—

That is right—as each child sees.
Now will you break 10 into halves, please?

All sing:— 7.

Come back, 10 ones, stand in a row!
Then into halves we break up—so.
5 over there and 5 over here;
5 is the half of 10, that is clear.

8.

2 halves come back; have a race—
See who can be the first in the place.
5 little ladies, 5 little men
Standing together once again.

Spoken by child:—

Can you do some more sums? Show us how.

Spoken by children in game:—

Numbers to make 10 we'll show now.

All sing:— 9.

1 away from 10 leaves 9;
1 stands on another line.
There's a sum; what can it be?
9 and 1 are 10, you see.

10.

Now take 2 away from 10;
What's the sum that we have then?
8 is left, 2 comes away;
8 and 2 are ten, we say.

1 2 3 4 5 6 7 8 9

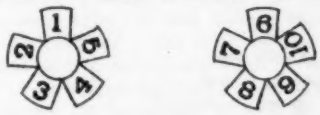
1 2 3 4 5 6 7 8 9 10

Form 5 couples. Partners face each other—raise hands and place palms against those of partner.

Face front again. Join hands.

1 2 3 4 5 6 7 8 9 10

Form two rings of 5 each and join hands.



1 2 3 4 5 6 7 8 9 10

1 2 3 4 5 9 7 8 6 10

1 2 3 4 5 6 7 8 9 10

2 3 4 5 6 7 8 9 10
1

3 4 5 6 7 8 9 10
2 1

11.

Oh! another comes off then;
Now we've taken 3 from 10.
3 from 10 leave 7, we show;
7 and 3 are 10, we know.

12.

4 comes running—watch him run;
4 from 10 leave 6—what fun!
6 and 4, what do they make?
They make 10, and no mistake.

13.

Let another now arrive;
5 away from 10 leaves 5.
Look! we've taken half away;
5 and 5 are 10—hooray!

14.

Forward 6 and 7 in line,
Forward 8 and forward 9.
9 away from 10 have run.
What is left? Why, only 1.

15.

1 and 9 are 10, you see;
Come, you lonely 1, to me.
Stand with us upon this line;
That is better—you look fine.

16.

Now we've all got back again—
Every one to make up 10;
Let us, while we have the chance,
Form a ring and have a dance.

17.

10 children dancing round and round;
Happier children can't be found.
10 go and rest now, every one;
10 away from 10 leave none.

4 5 6 7 8 9 10
3 2 1

5 6 7 8 9 10
4 3 2 1

6 7 8 9 10
5 4 3 2 1

Children all wave hands.

7 8 9 10 8 9 10
6 5 4 3 2 1 7 6 5 4 3 2 1
9 10 10
8 7 6 5 4 3 2 1 9 8 7 6 5 4 3 2 1

9 children in line turn completely round and beckon to child who is left. Child joins them.

10 9 8 7 6 5 4 3 2 1

Children join hands and dance round in circle.

Every child go back to original place in class.

N.B.—This game, if each operation is to be thoroughly understood by the children and applied to different objects (for example, shells and counters on desks, etc.), will be found to contain sufficient material for several weeks' number lessons.

An introduction to this game was used by the infants of Anfield Road Council School, Liverpool, at a public exhibition of games. I give it below, as it may be useful to some readers.

1st child (*spoken*):—Come, children, shall we do our sums?
Those jolly sums—you know the way.
2nd child:—Oh, don't do sums! I don't like sums.
To tell the truth, *I'd* rather play.
3rd child:—Just wait a bit, until you see
The way we children do sums now.
4th child:—If you will listen, you'll soon learn,
For we are going to show you how.
5th child:—What number shall we have to-day?
Think of a number, all of you.
6th child:—Let's play with 10; shall we have 10?
All class:—Yes, that we all agree to do.
7th child:—Let everybody do his part.
Now we are ready for a start.

WORK FOR ALL.

An Important Book on Careers.

A book which ought to prove of real interest to all of us will be *Careers for Men, Women, and Children*, edited by George Edgar, to be issued in February by Messrs. George Newnes, Ltd.

On looking over the scheme of the work, the wonder grows on the reader that the idea has never been elaborated before. The book is meant for all face to face with the necessity of choosing a career in some order of social life, and should fire the imagination of the boy or girl on the threshold of life, the man or woman hopelessly stuck in the *cul de sac* that leads nowhere, and parents or guardians faced with the necessity of knowing what to do with their charges. *Careers for Men, Women, and Children* promises to describe more than 750 occupations.

RELIGION, MORALS, AND MANNERS.

A COURSE OF BIBLE TEACHING FOR THE SCHOOL AND HOME.

BY J. EATON FEASEY, HEADMASTER OF THE RANMOOR SCHOOL, SHEFFIELD (UNIVERSITY DEMONSTRATION SCHOOL), A LECTURER IN EDUCATION IN THE SHEFFIELD UNIVERSITY.

IV.

WORK.—"THE LATEST GOSPEL IN THE WORLD."

THERE probably never was a time when questions connected with work and workers were so much discussed as they are at present. Problems of unemployment, of the health and safety of the workers, of the hours of labour and of its remuneration—these are discussed in newspapers, in congresses and conferences, in councils and in parliaments incessantly.

And possibly, too, there never was a time when work itself was more commonly looked upon as an evil, a thing to be avoided, and, in some cases, even to be ashamed of. Many look forward to the time when they will be rich enough to cease work; many, especially young people, dislike exceedingly to show by their dress or their talk that they "go to work." The youth aspires always to wear a black coat; the young lady speaks of "going to business"—never to "work." To be classed as a "working-man" or "working-woman" rather than as a clerk or typist would grievously offend.

It is worth while, therefore, to inquire as to what is the teaching of the Bible, and especially of the New Testament, upon the subject.

In Sir Thomas More's *Utopia*, describing the ideal land of "Nowhere," there is an instructive passage about the arrangements under which work was there carried on. There was a class of officials whose sole business it was "to see and take heed that no man sit idle, but that every one apply his own craft with earnest diligence. And yet, for all that, not to be wearied from early in the morning till late in the evening with continual work like labouring and toiling beasts. For this is worse than the miserable and wretched condition of bondmen."

Now Sir Thomas More knew the Bible, and it is probable that we shall find his teaching is not much different from that given there. Let us see.

"And unto Adam he said, Because thou hast hearkened unto the voice of thy wife, and hast eaten of the tree, of which I commanded thee, saying, Thou shalt not eat of it: cursed is the ground for thy sake; in sorrow shalt thou eat of it all the days of thy life; thorns also and thistles shall it bring forth to thee; and thou shalt eat the herb of the field; in the sweat of thy face shalt thou eat bread, till thou return unto the ground; for out of it wast thou taken: for dust thou art, and unto dust shalt thou return" (Gen. iii. 17-19).

"Now we command you, brethren, in the name of our Lord Jesus Christ, that ye withdraw yourselves from every brother that walketh disorderly, and not after the tradition which he received of us. For yourselves know how ye ought to follow us: for we behaved not ourselves disorderly among you; neither did we eat any man's bread for nought; but wrought with labour and travail night and day, that we might not be chargeable to any of you; not because we have not power, but to make ourselves an ensample unto you to follow us. For even when we were with you, this we commanded you, that if any would not work, neither should he eat. For we hear that there are some which walk among you disorderly, working not at all, but are busybodies. Now them that are such we command and exhort by our Lord Jesus Christ, that with quietness they work, and eat their own bread. But ye, brethren, be not weary in well doing" (2 Thess. iii. 6-13).

The first of these passages contains the words of God to Adam immediately after the fall. They impose work, labour, upon the human race. The second enforces the law that none may claim exemption from work. St. Paul, speaking as an apostle, *ex cathedra*, "in the name of the Lord Jesus," lays it down that the right to eat is conditional upon willingness to work. He himself set a splendid example of industry. Whilst preaching and teaching he might reasonably have allowed the church to maintain him; but so fearful was he lest he should create a wrong impression, that he worked daily at his trade as a tent-maker, and maintained himself independently of the contributions of the church.

It is to be noted that it is "willingness to work" which is given as the condition of the right to eat. Hence no hardship is inflicted upon those who, because of age or infancy, because of sickness or accident, or because of inability to get work, do not labour. But if a person has not the *will* to work, then Paul's doctrine appears to be that that man has lost the right to eat—that is, he has lost the right to those things which enable a person to live a life of happy, healthy industry and peace.

"Unwillingness to work" is then a thing to be condemned and to be ashamed of; the avoidance of work, on whatever pretext, is wrong. Of course the term "work" is very wide. It will include work of brain as well as work of hand; the work of the statesman as well as that of the carpenter; that of the teacher as well as that of the ploughman; work done to benefit others, without fee or reward, as well as work done for a daily wage. The mere fact that a person has "no need to work," because he has an income sufficient to maintain him independently of his own labour, does not exempt him from the law of work. If such a person claim that there is no need for him to work, the obvious and proper answer is that that is so, for there is no need for him to live. The world can get along without the man who is not willing to do his share of its work. In Utopia the Siphogants were "by the laws exempt and privileged from labour;" yet, says Sir Thomas More, "they exempt not themselves." "It is an insufferable pride for any man," says Barrow, "to pretend or conceit himself to differ so much from his brethren that he may be allowed to live in ease and sloth while the rest of mankind are subject to continual toil and trouble."

So far, then, from "looking down" upon work, or thinking of it as a thing to be despised, we ought rather to look upon it as a dignified and noble duty. It should be remembered that Jesus Christ worked as an ordinary carpenter, and two of His great sayings are these:—

1. "My Father worketh hitherto, and I work" (John v. 17).
2. "There are six days in which men ought to work" (Luke xiii. 14).

And since Christ has laboured at the bench, manual labour is for ever dignified and consecrated.

Carlyle well says: "There is a perennial nobleness and even sacredness in work. Were he never so benighted, forgetful of his high calling, there is always hope in a man that actually and earnestly works; in idleness alone there is perpetual despair. Work, never so mammonish, mean, *is* in communication with Nature; the real desire to get work done will itself lead one more and more to truth. The latest gospel in the world is: 'Know thy work, and do it.'"

There is a great deal of teaching also in the Bible

as to the spirit and manner in which one's daily work should be done. The grudging spirit which does the least it can for the pay given, the indifferent, half-hearted toil of the uninterested, is condemned. The worker should do his work frankly, openly, cheerfully, from the very soul, handsomely, as befits those who are in the service of the Lord Jesus, "who sees all things and scrutinises the reins and the heart." This appears to be the teaching of the following New Testament passages:—

"Servants, be obedient to them that are your masters according to the flesh, with fear and trembling, in singleness of your heart, as unto Christ; not with eyeservice, as menpleasers; but as the servants of Christ, doing the will of God from the heart; with good will doing service, as to the Lord, and not to men: knowing that whatsoever good thing any man doeth, the same shall he receive of the Lord, whether he be bond or free. And, ye masters, do the same things unto them, forbearing threatening: knowing that your Master also is in heaven; neither is there respect of persons with him" (Eph. vi. 5–9).

"Servants, obey in all things your masters according to the flesh; not with eyeservice, as menpleasers; but in singleness of heart, fearing God: and whatsoever ye do, do it heartily, as to the Lord, and not unto men; knowing that of the Lord ye shall receive the reward of the inheritance: for ye serve the Lord Christ. But he that doeth wrong shall receive for the wrong which he hath done: and there is no respect of persons" (Col. iii. 22–25).

"Not slothful in business; fervent in spirit; serving the Lord" (Rom. xii. 11).

If one shall work in *this* spirit, it is clear that first of all his work will be a joy to him, and no burden. Otherwise, again to quote Carlyle, "all men, if they work not as in a Great Taskmaster's eye, will work *wrong*, will work unhappily, for themselves and for you."

So far we have looked at the matter from the point of view of the work and worker. The Bible, however, insists not only that men shall work and work *well*, but upon two other things—(1) that the work shall not be excessive, but that opportunities for rest shall be given; and (2) that the worker shall be fairly treated by his employer, if he have one, as to wages and other conditions.

1. The fourth commandment is in the main a great command that man and beast shall have time for rest. And even in a *busy* time the pressure of business was not to prevent the rest of the sabbath.

"Six days shalt thou work, but on the seventh day thou shalt rest; in earing time and in harvest thou shalt rest" (Exod. xxxiv. 21).

Incessant grinding toil is clearly repugnant to the law of God.

2. As to just, considerate, kindly treatment of the employed by their employers, many instructions are given. Jesus Christ asserted (Luke xvi. 7) that "the labourer is worthy of his hire," and of course His whole doctrine of righteousness and mercy enforces these things upon all employers. See also—

"Masters, give unto your servants that which is just and equal; knowing that ye also have a Master in heaven" (Col. iv. 1).

The Levitical law had provisions also in this spirit, as, for example:—

"Thou shalt not defraud thy neighbour, neither rob him: the wages of him that is hired shall not abide with thee all night until the morning" (Lev. xix. 13).

Imagine the happy state where all this Bible teaching was universally practised—where all men worked willingly, gladly, conscientiously; where all labour received its just reward, accompanied by generous consideration and love; where none were overworked either of man or beast; where men whom "the Lord had called by name," like Bezaleel, the son of Uri, and Aholiab, the son of Ahisamach, and whom He had "filled with wisdom and knowledge in all manner of workmanship," had it also "put in heart that they might teach" their craft to all who "had a mind to work!" Surely this would be that happy land of which Isaiah sang, the land of health and longevity, where "the elect shall long enjoy the work of their hands."

"The Land of his Heart's Desire."*

"The boy went out from the ranges grim,
And the breath of the mountain went with him,
With a song in his heart and a smile on his face,
And a light in his eyes for the foremost place.
And the good, green earth and the salt sea spray,
And the soft blue skies, they were his that day.
And, like Eden, ringed with a golden fire,
Afar rose the Land of His Heart's Desire.

"The boy went down to the city's strife,
And his face was lost in the surge of life;
But a Power that he did not understand
Had nerved his brain and his fighting hand.
And he strove and failed, and he rose and won—
And he failed again ere the fight was done;
But he battled on when the days were dire
To win to the Land of His Heart's Desire.

"And there, in the heart of the stress and din,
'Mid want and labour and wealth and sin,
The strong man struggled with shining eyes,
And forced a passage, and grasped the prize.
And he cried to the Power who had lent the fire,—
'Lo, Fame is the Land of My Heart's Desire!
Give the cup to me with a beaded brim.'
And the Power that he knew not gave it him.

"But the air is keen on the cliffs of Fame,
And the shafts that fly have a deadly aim!
With a foothold scarce, and a sleepless dread
For the gulfs below and the heights o'erhead,
He cried to the Power who had steeled his hand,—
'I am outcast yet from my Fairyland!
For Fame is a land where no strength may tire,
But Love is the Land of My Heart's Desire!'

"Then there came to the man all his dream of Love,
With the brow of snow and the eyes of a dove,
With the glint of the sun on her wavy hair,
And her soul as pure as her face was fair.
Like a living lily to him she came,
Till his eyes were wet and his soul was flame;
And she called to him with an outstretched hand,
And they entered into the Promised Land.

"But there came a day when he asked his soul,—
'Is this the land, and is this the goal?'
In his heart there lay what his lips denied—
The pang of a hunger unsatisfied.
'For Fame,' he said, 'and for Love I wrought;
They are not the things that I should have sought.
'Tis to boundless power that my dreams aspire,
And Wealth is the Land of My Heart's Desire!'

"Then the Power that he did not understand
Gave him ships and houses and gold and land,
And the man's power grew with each passing year;
But his thoughts were vexed with a sleepless fear,
And his hair grew gray with the iron strain
Of the dread of loss and the lust of gain,
And he bowed his head on his hands and said,—
'All things are mine, but my heart is dead!'

"And he thought of the boy from the ranges grim
With the heart of the mountains over him,
With a song in his heart and a smile on his face,
And a light in his eyes for a foremost place.
And the good, green earth and the salt sea spray,
And the soft blue skies that were his that day,
When, like Eden, ringed with a golden fire,
Afar rose the Land of His Heart's Desire.

* Quoted from Chambers's *New Recitations for Schools*, with due acknowledgments.

"Then clear on his startled ear there fell
A voice like the sound of a silver bell,—
'To each is the work that he best can do,
But you turned from the work when it called to you.
And you sought instead for the vulgar praise,
For the lips of love and for prosperous days.
And with all that the world can give you here,
You have lost the things that you hold most dear.
For who hears the word that the gods inspire,
In his *work* finds the Land of His Heart's Desire.'"

G. S. EVANS.

OUR PHOTOGRAPHIC COLUMN.

PLATES VERSUS FILMS.—IMPROVING THE NEGATIVE.

BY THOMAS A. BRIGGS.

YEARS ago, when the roll-film first came into use, it was predicted that it would soon replace the glass plate in general favour. It has done so to a large extent, and I should think that quite half the amateurs to-day who use cameras work with roll or cut films. I propose to occupy a few lines in this chapter, to consider the advantages of films over plates and *vice versâ*, as no doubt it will be useful to some who are shortly purchasing cameras.

The roll-film scores easily on the holiday tour, for it is convenient to load and unload in daylight. Development in daylight, as shown in a previous chapter, is also quite a simple matter; and this fact alone has brought thousands to the pastime who otherwise would have voted it a "fag." The spools of film are so small and light that several will pack into a jacket pocket without inconvenience. Minor advantages are: reversibility for printing purposes, ease of storage, the fact that they require no "backing" (I will speak of this later), and the fact that twelve pictures can be developed at one time in the roll.

Of course there are thorns to this rose, and some people hold that the plate is preferable to the film when all the points are weighed up. The roll-film is three times the cost of plates of the same size, and this is a great consideration to those who use a large number, or who are of limited means. Damage to the celluloid is another slight disadvantage, and necessitates care in handling. Films seem to have a fatal attraction for finger-marks, and should only be touched by the edges. Finger-prints are most useful in a court of law, but they do not improve the artistic effect of an enlargement. The nuisance of films curling up in the various solutions can be overcome by using spring clips, as mentioned before. These clips are somewhat like the "bull-dog" paper clip, and are attached to each end of the film, the roll being cut up into single pictures before development. The clips are forced apart by means of a "V" made of wire, which forms a handle, so that the fingers may be kept quite out of the solution.

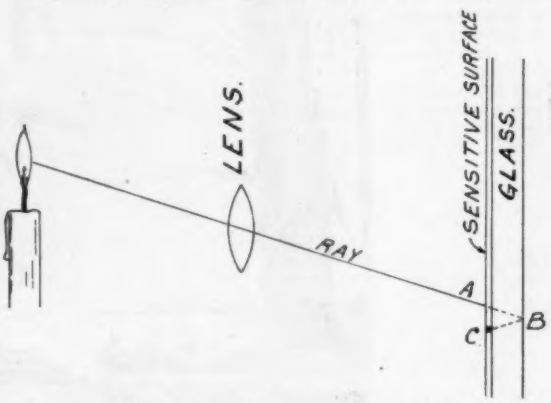
The glass plate is cheap in comparison with the film; it is easy to handle, as it may always be picked up by the edges. It can also be obtained in a great variety of brands and speeds, though I think that this is a disadvantage as far as the amateur is concerned. There is a temptation to try all sorts of plates and chemicals, flitting from one to the other, and understanding none of them well.

Regarding the difficulty of loading plates in daylight, this is a problem which will probably soon be solved; indeed, there is already a device on the market for loading and unloading, but I cannot speak of this at present.

Then, again, there are the various envelope systems, in which each plate is placed in a card envelope case, ready for use in a special dark slide. When large sizes are required, you must perforce use plates, for films are not obtainable in sizes above 7 × 5. I have used "Kodoid" plates with great satisfaction. These, as mentioned before, are made of celluloid clipped on to cards, and besides being orthochromatic, are only one-third the weight of plates. Their price is 25 per cent. greater than glass plates.

The disadvantage of the glass plate is the weight and its liability to breakage; but if you are willing to carry a little more about with you—and a dozen quarter plates do not weigh so very much—and use a little care to prevent damage, the plate has a distinct value over the film.

One useful article which the amateur never seems to appreciate fully is the "backed" plate. This is a plate which has the back or glass side covered with caramel and burnt sienna. These should be bought ready backed, as the operation is a most messy one.

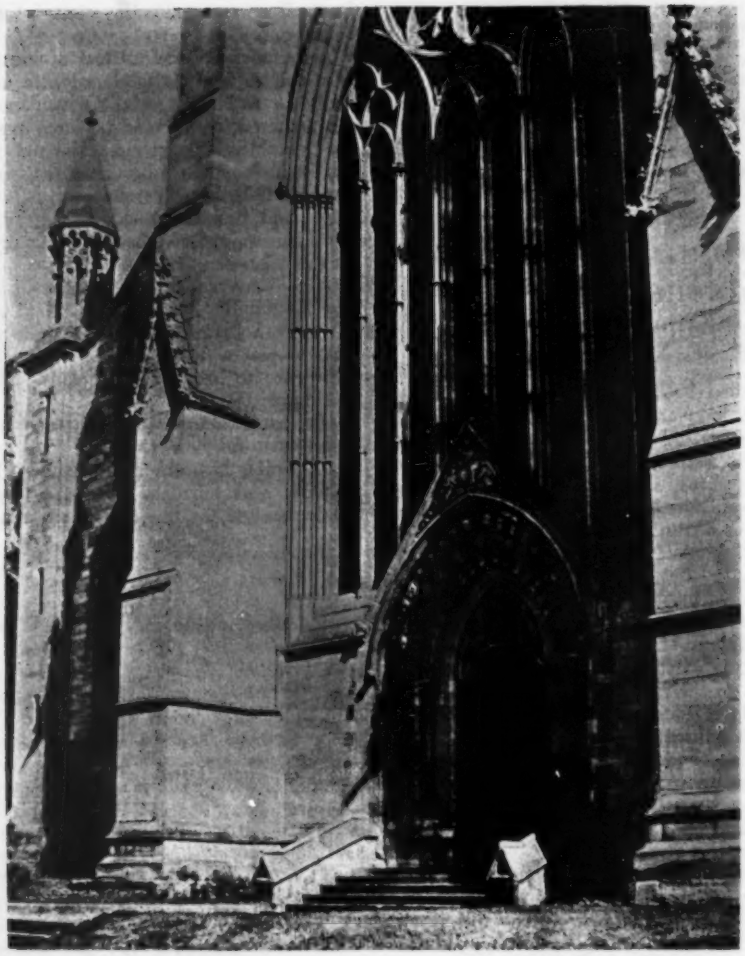


The covering is for the prevention of "halation," which I will briefly describe.

When a ray of light from any source passes through the lens, as in the figure, it strikes the sensitive surface of the plate at the point A; most of it is stopped by the opaque surface, but some portion passes onwards to B, and is reflected from the back surface of the plate to the under surface of the gelatine at C, making an indefinite image around the true one. This produces that "woolly" effect so often seen when slender objects, such as branches, are seen against the sky. The same effect can be obtained with the eye by looking at a lamp or the sun when part of it is hidden behind a telegraph pole.

The backing is to prevent this defect, and these plates must be used if a subject with strong contrasts is to be photographed—for example, an interior, with the windows showing in the picture. Nearly all subjects appear better if taken on backed plates, and the extra cost (3d. on a dozen quarter plates) is well repaid.

No matter with what care you expose and develop, you will find negatives which give poorer prints than usual, and I will treat of some of the defects likely to be found in them. The commonest fault is that of under-exposure and over-development, the negative having had probably a quick shutter exposure, and a long development with the idea of bringing out the



detail. You must remember that, if the plate has been grossly under-exposed, no amount of development will bring out detail which is not there to begin with. All that the developer can do is to produce greater contrasts, which yield a print that we term "soot and whitewash." The picture of the cathedral window given herewith is a good example of this defect. You will notice that the high lights are very white, and have practically no gradation in them; while the shadow portions, such as the glass of the window, are just blocked up masses, without detail in them. The only remedy is to develop by factor, and not to try to force detail out of the plate, though this is a temptation which, I must admit, is very difficult to resist.

Over-exposure, on the other hand, tempts you to under-develop, and so get poor contrasts and a flat result in the print, the difference in tone between the sky and the landscape being very small, owing to the action of the developer being stopped much too soon. The remedy is as above, to develop the plate regardless of appearances. The plate will soon darken all over, and the image appear to be entirely blacked out; but it is there all right, and except that the negative will be thicker and take longer to print, nothing need be feared on this account.

Should a plate have had a correct exposure but insufficient development, you can intensify it in the following manner:—The image is bleached first, which may conveniently be done by means of the "tabloid" chromium intensifier, one tabloid to every two ounces of water. The plate is washed for half an hour, and then redeveloped in any ordinary developer to the requisite strength. If the negative is still weak, the process may be repeated several times. Reducing is the opposite process, and is even simpler. If the plate is too thick, it is placed in a solution of ordinary hypo, to which have been added a few drops of potassium ferricyanide. Only enough of the latter should be added to make the solution a pale lemon colour; and care should be taken, as this chemical is poisonous.

The after treatment of the negative may seem an unnecessary trouble, but it is generally worth it, and many a poor negative has been made printable by this means, when it otherwise would have joined the vast army of pictures that "might have been."

NEXT MONTH.

OUR GREAT LITERARY COMPETITION.

A NEW COURSE OF PRACTICAL AND CONSTRUCTIVE WORK,

ARISING OUT OF AND COMBINED WITH THE ORDINARY SCHOOL SUBJECTS.

For Junior, Middle, and Upper Divisions of Primary Schools.

BY A. R. PICKLES, M.A., AND DALTON GRANGE.

LESSON 58.—ANGLES.

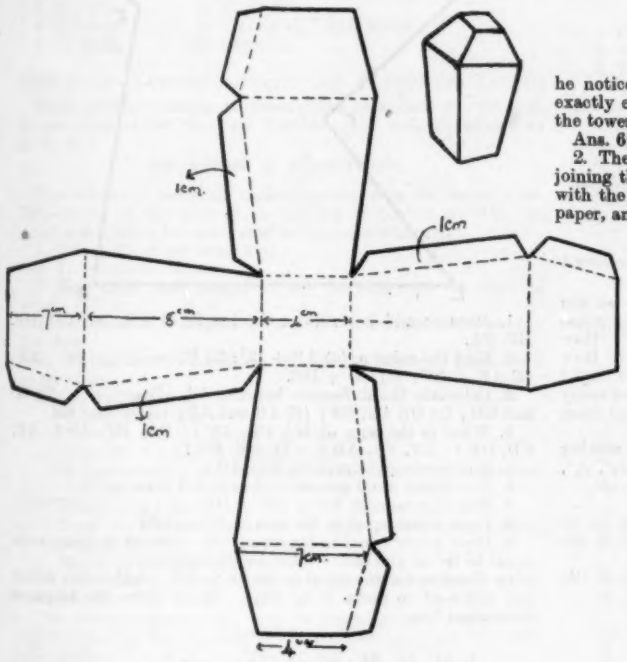
THE drill lesson may be utilised to provide exercises, and to illustrate various angles. The hands of the clock may also be used for providing similar exercises and illustrations.

Drill Lesson.—Right turn! Through what angle have you turned? Half-right turn! Right about turn!

Clock.—(Use clock face with movable fingers.) Put fingers at 1 and 3. What angle do they make? What angle does the minute finger move through in 15 minutes? 5 minutes? 10 minutes, etc.

LESSON 59.—PAPER MODELLING: THE VASE AND MATCH STAND.

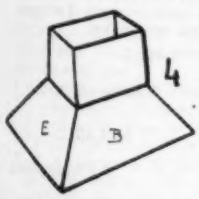
The Vase.



Cut out along the thick lines, folding along the dotted lines. Fix together.

QUESTIONS ON AREAS, ETC.

Draw a square of 34 cm. side. Join the middle points of opposite sides of this square. Complete as in the diagram.



Draw a rectangle 3" × 2" (the dotted rectangle of the diagram). Then construct outside this, 1½" from it, another rectangle. On this place the shorter parallel sides of the trapezoids. Complete as on diagram.

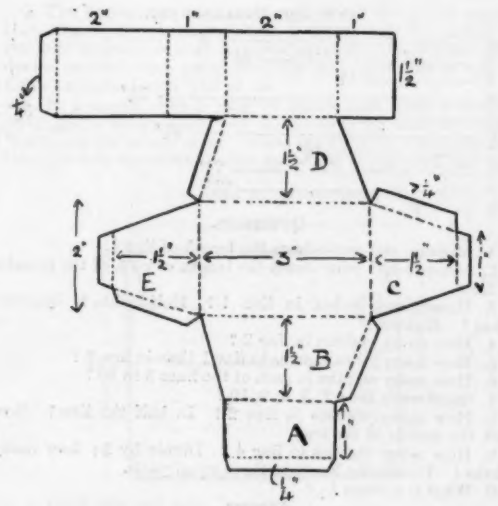
Cut out along the thick lines, then fold along the dotted lines. A is fixed first, being gummed on the inside of the portion opposite to B (Fig. 2). Then C, D, and E are fixed. The flaps on C and E are to fix the remaining portion of the stand.

LESSON 60.—PLOTTING OUT.

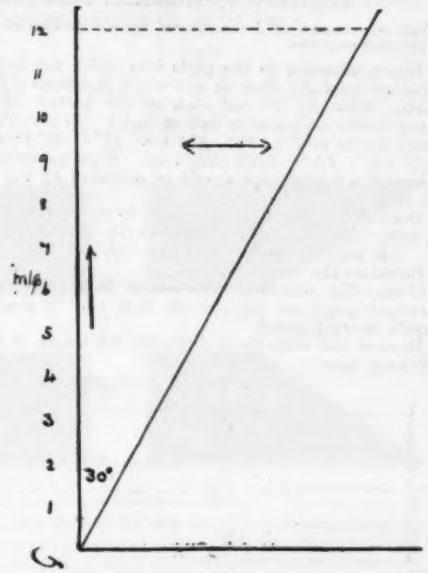
1. John is cycling northwards along a road. On the right, at an angle of 30°, with the direction in which he is travelling he notices a tower. Twelve miles farther north the tower is exactly east. Draw on squared paper, and find the distance of the tower when the cyclist noticed that it was exactly east.

Ans. 6¾ miles.

2. The shadow of a chimney measures 100 feet. The line joining the top of the chimney to the end of the shadow makes with the end of the shadow an angle of 30°. Draw on squared paper, and write down the height of the chimney.



The Match Stand.



LESSON 61.—MEASUREMENTS, INTRODUCING ONE-EIGHTH.

Note (a).—Graph a sufficient number of copies of the lines for measurement to give one to each pupil.

Direct attention to the parts into which the inches on the ruler are divided. How many half-inches in 1"? How many quarter-inches? Write down (using figures) one-quarter. Why do we call it ¼"? Find an inch which is divided into eight equal parts on your ruler. What will you call each part? Why? How many of them in half an inch? Quarter of an inch? Three-quarters? Two inches? One inch and a half? etc., etc. These questions to be answered from the ruler.

Lines for Measurement.

1. —— 3″
2. —— $2\frac{1}{4}$″
3. —— $1\frac{1}{4}$″
4. —— $3\frac{3}{4}$″
5. —— $5\frac{1}{8}$″
6. —— $3\frac{3}{8}$″
7. —— $1\frac{3}{4}$″
8. —— $2\frac{1}{8}$″
9. —— $2\frac{3}{4}$″
10. —— $\frac{1}{4}$″

Questions.

1. Measure and write down the length of line 1.
2. Measure and write down the length of each of the remaining lines.
3. How many inches in line 1? Half-inches? Quarter-inches? Eighths?
4. How many eighths in line 2?
5. How many more eighths in line 1 than in line 2?
6. How many eighths in each of the lines 3 to 10?
7. Quarters in lines 2, 3, 4, 9, 10?
8. How many eighths in line 2? In half the line? Now mark the middle of the line.
9. How many eighths in line 4? Divide by 3; how many eighths? Divide the line into three equal parts.
10. What is 3 times $1\frac{1}{4}$?

Answers.

1. 3″.
2. $2\frac{1}{4}$″, $1\frac{1}{4}$″, $3\frac{3}{4}$″, $5\frac{1}{8}$″, $3\frac{3}{8}$″, $1\frac{3}{4}$″, $2\frac{1}{8}$″, $2\frac{3}{4}$″, $\frac{1}{4}$″.
3. 3″, 6 half-inches, 12 quarter-inches, 24 eighths.
4. 20 eighths.
5. 4 eighths.
6. 10, 30, 41, 27, 13, 23, 22, 4.
7. 10, 5, 15, 11, 2.
8. 20, 10.
9. 30, 10.
10. $3\frac{3}{4}$.

Measurements, introducing One-tenth.

Note (*a*).—Graph a sufficient number of copies of the lines for measurement to give each pupil one.

Direct attention to the parts into which the inches on the ruler are divided. Find an inch which is divided into ten equal parts. What do we call each of the parts? Why? How many tenths are equal to half an inch? To $\frac{1}{4}$? To $\frac{3}{4}$? How many tenths in 2″? 3″? 4″? etc. $2\frac{1}{2}$″? $3\frac{1}{2}$″? $4\frac{1}{2}$″? $5\frac{1}{2}$″? $6\frac{1}{2}$″? $1\frac{4}{10}$″? $1\frac{7}{10}$″? $2\frac{1}{10}$″? $2\frac{6}{10}$″? etc. These questions and many others of a similar type should be answered by the pupil from the ruler.

Draw the attention of the pupil to another way of writing $\frac{1}{10}$ inch—namely ·1. Ask pupils to write down $\frac{7}{10}$″, $\frac{3}{10}$″, $\frac{9}{10}$″, $\frac{4}{10}$″, $\frac{5}{10}$″. Ask pupils to write in this way—$2\frac{3}{10}$″, $7\frac{1}{10}$″, $5\frac{3}{10}$″, $6\frac{1}{10}$″, etc.

Introduce the word "decimal."

(*Note.*—The following lines should be reproduced so as to give each pupil one copy, or the lines may be graphed in the pupil's drawing-book.)

Measure and write down decimally the length of each of the following lines:—

Lines for Measurement.

1. —— 4″
2. —— $\frac{6}{10}$″
3. —— $2\frac{1}{2}$″
4. —— $3\frac{3}{10}$″
5. —— $1\frac{1}{10}$″
6. —— $4\frac{4}{10}$″
7. —— $4\frac{1}{2}$″
8. —— $1\frac{6}{10}$″
9. —— $3\frac{1}{10}$″
10. —— $2\frac{8}{10}$″

Questions. (*These can be multiplied almost indefinitely.*)

1. How many tenths in line 1? Line 2?
2. Find by vulgar fractions the sum of lines 1 and 2. Then do this decimally. Repeat with lines 1 and 3, lines 4 and 5.
3. Repeat with lines 1, 2, 3, lines 2, 3, 4.
4. How many tenths in line 1? Line 2? What is the difference in tenths? In inches and tenths? In inches and a decimal?
5. How many tenths in line 2? Line 6? How many times is line 6 longer than line 2?
6. How much must you add to line 10 to make it 3″ long? Write this answer as a decimal.
7. From line 6 cut off ·9 of an inch. What length remains?
8. What decimal of an inch must be taken from line 4 and put on to line 5, so that the two will have the same length?
9. What decimal of an inch must you take from line 9 to make it 3·5″ long?
10. A line is drawn seven times as long as line 2. What length is it?

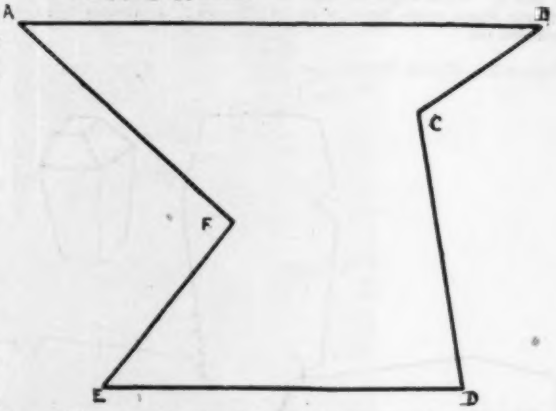
(Work both as a vulgar fraction and as a decimal fraction.)

Answers.

1. 40 tenths, 8 tenths.
2. $4\frac{1}{2}$″, 4·8″.
3. $7\frac{4}{10}$″, 7·3″.
4. $3\frac{1}{2}$″, 3·2″.
5. 6 times.
6. ·1″.
7. 3·9″.
8. 1·1″.
9. ·2″.
10. $5\frac{3}{4}$″, 5·6″.

Some Exercises in Measurement, introducing Eighths.

Graph a sufficient number of copies to give each child one; or, better still, reproduce in the pupil's drawing-book by means of a multiplying apparatus.



1. Measure and write down the length of AB, BC, CD, DE, EF, FA.
2. Find the value of (*a*) AB + BC; (*b*) BC + CD; (*c*) BC + EF; (*d*) AB + AF; (*e*) CD + DE.
3. Calculate the difference between (*a*) AB and BC; (*b*) BC and CD; (*c*) DE and EF; (*d*) AB and AF; (*e*) BC and EF.
4. What is the sum of BC, CD, EF? DE, EF, AF? AB, CD, DE? EF, FA, AB? CD, DE, EF?
5. How many eighths in the line AB?
6. How many more quarter-inches in AB than in CD?
7. Find the value of AB + FE − DE.
8. Draw a line equal to the sum of BC and EF.
9. Draw a line equal in length to AB. Cut off as many parts equal to BC as you can. What length remains?
10. Construct a line equal in length to EF. Add to it a dotted line sufficient to make it $3\frac{1}{2}$″ long. Write down the length of the dotted line.

Answers.

1. $4\frac{1}{2}$″, $1\frac{1}{2}$″, $2\frac{1}{2}$″, $3\frac{1}{2}$″, $1\frac{7}{8}$″, $2\frac{1}{8}$″.
2. $6\frac{1}{2}$″, $3\frac{1}{2}$″, $3\frac{1}{2}$″, $7\frac{1}{2}$″, $5\frac{1}{2}$″.
3. $3\frac{1}{2}$″, $1\frac{1}{2}$″, $1\frac{1}{2}$″, $2\frac{1}{2}$″, $\frac{1}{2}$″.
4. $5\frac{1}{2}$″, $7\frac{1}{2}$″, $10\frac{1}{2}$″, $9\frac{1}{2}$″, $7\frac{1}{2}$″.
5. 38.
6. 9.
7. $3\frac{1}{2}$″.
8. Line $3\frac{1}{2}$″ long.
9. $\frac{1}{2}$″ remain.
10. $1\frac{1}{2}$″.

Some Exercises in Measurements, introducing Tenths and Measurement according to Scale.

The Cricket Field. $\frac{1}{10}$″ = 1 yard.

* Long on

* Long off

Bowler *...

* Mid off

Mid on *

* Cover point

* Batsman

... * Point

* Wicket keeper

* Leg

* Short slip

*Long slip

Graph a sufficient number of copies to give each child one; or, better still, reproduce in the pupil's drawing-book with multiplier.

1. What is the difference between the wickets ?
2. How far is "point" from the bowler ?
3. The batsman drives a ball to "mid off." How far has the ball gone from the bat ?
4. How much farther from the batsman is "long on" than "mid on" ?
5. "Long off" throws the ball to the bowler. How many yards does he throw it ?
6. The batsman sends the ball to "leg," who returns it to the bowler. How many yards has it travelled since leaving the bowler's hand ?
7. Which fielder is farthest away from the batsman ? How many yards away is he ?
8. How many yards is it from "point" to "mid off" ?
9. Who is the nearer to the bowler, "long on" or "long off," and by how many yards ?
10. How many yards will the wicket-keeper walk at the end of each over from behind one wicket to the same distance behind the other wicket ?

Answers.

1. 22 yards.
2. 25 yards.
3. 27 yards.
4. 17 yards.
5. 18 yards.
6. 63 yards.
7. "Long on" and "Long off." 33 yards.
8. 21 yards.
9. "Long on," by 3 yards.
10. 24 yards.

Some Ruler Exercises, introducing Eighths and Tenths.

Ruler exercises similar to those given in Lesson 41 (see September issue of the *Practical Teacher*) may with advantage be given here.

Measurement of Actual Objects.

The following practical measurements may be taken now. Preparation on the part of the teacher is needed, so that the pupil is not asked to make unsuitable measurements.

1. The width of the desk top.
2. The width of the seat.
3. The width and length of the drawing-book or drawing paper.
4. The width and length of the various exercise books used in the class.
5. The width and length of the various sizes of paper used in the class.
6. The reading book :—
   (*a*) Length of a page.
   (*b*) Length and breadth of a certain picture.
   (*c*) Length of a line of printed matter.
   (*d*) Distance from one letter to another, one stop to another, etc.
7. Width of the ruler.
8. Total of a certain number of spaces on writing paper, arithmetic paper, etc.
9. The sides of the set square.
10. The distance between the inkwells, their greatest width, their height.

The above measurements may be made by each pupil at the same time, and the checking of the answers need not be a difficult matter.

Lesson 62.—Drawing of Objects Half Size, Double Size, etc.

1. Draw a square having a side of 8 cm. Write its area inside. By its side draw another square, whose sides are each half the length of the sides of the square just drawn. What is the area of this second square ? How many times shorter is each side than the side of the first square ? How many times is the area less ?

Repeat with the following squares :—
(1.) 9 cm. side, and a side 3 times less.
(2.) 4 in. side, and a side 4 times less.
(3.) 10 cm. side, and a side 5 times less.

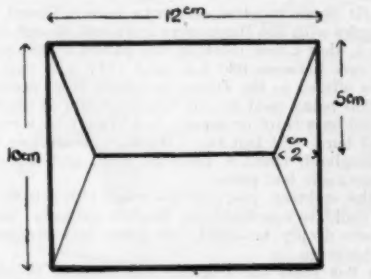
2. Draw a rectangle having sides of 8 cm. and 6 cm. Write its area inside. By its side draw another rectangle, whose sides are each half the length of the sides of the rectangle just drawn. What is the area of the second rectangle ? How many times shorter is each side ? How many times less is the area ?

Repeat with the following rectangles :—
(1.) 12 cm. × 9 cm., and sides 3 times less.
(2.) 4″ × 2″, and sides 4 times less.
(3.) 10 cm. × 5 cm., and sides 5 times less.
(4.) 12 cm. × 6 cm., and sides 6 times less.

3. The pupils will no doubt notice from the above examples that when a square or rectangle is drawn half the actual size, the area as drawn is only one-quarter of the actual area. When drawn one-third the actual size, the area as drawn is only one-ninth the actual area, and so on.

4. In a similar way it may be shown that when a square or rectangle is drawn twice the actual size, the area as drawn is four times the actual area. When drawn three times the actual size, the area as drawn is nine times the actual area, and so on.

The Back of an Envelope.

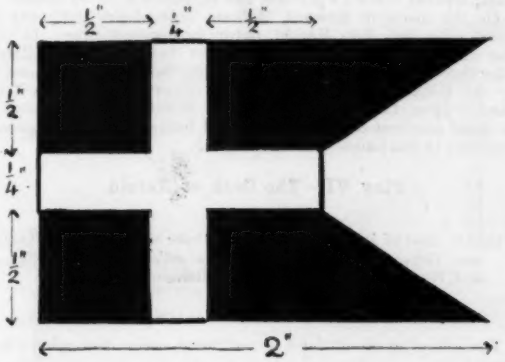


1. Draw this half size.
2. What is the actual perimeter of the back of the envelope ?
3. Find the perimeter of the drawing.
4. What decimal fraction is the perimeter of the drawing of the actual perimeter ?
5. Measure and write down in inches and a decimal the length of the diagonal of the drawing of the back of the envelope.
6. What is the actual length of the diagonal of the back of the envelope ?
7. Find the area of the drawing.
8. From this find the actual area of the back of the envelope.
9. Calculate the area of the flap as shown in the drawing.
10. Write down the actual area of the flap.

Answers.

2. 44 cm. 3. 22 cm. 4. ·5. 5. 3·1″. 6. 6·2″.
7. 30 sq. cm. 8. 120 sq. cm. 9. 12·5 sq. cm. 10. 50 sq. cm.

The Naval Flag of Denmark.



1. Draw this double the size in your books, and also on the back of some red gummed paper. Cut out the red pieces, and fix on the drawing in your book as shown in the diagram.
2. What is the difference in length between the vertical and horizontal edges as seen in the drawing ?
3. What is the actual difference ?
4. Find the area according to your drawing of one of the red trapezoids.
5. Find the total actual area of both the trapezoids.
6. Write down the actual area of one of the red squares.
7. Find the area of the white cross as seen on your drawing.
8. Write down the actual area of the cross.
9. Now calculate the actual area of the flag.
10. What is the area of the red trapezoid that remains on the desk ?

Answers.

2. $1\frac{1}{2}$ in. 3. $\frac{1}{4}$ in. 4. $1\frac{1}{8}$ sq. in. 5. $\frac{7}{8}$ sq. in. 6. $\frac{1}{4}$ sq. in.
7. $2\frac{1}{4}$ sq. in. 8. $\frac{5}{16}$ sq. in. 9. $1\frac{11}{16}$ sq. in. 10. $2\frac{1}{8}$ sq. in.

Experiments in Dramatic History.

BY FRED. E. MELTON, SHENLEY, BUCKS.

(*Continued from page* 414.)

THE NORMAN INVASION.

SUMMARY.

A PERIOD of one hundred and forty years followed, in which struggles with the Danes were incessant, though it was not until 980 A.D. that a firm foothold was gained by the invaders.

In the years between 980 A.D. and 1017 A.D. vast sums of money were offered to the Danes to refrain from attacking the land—£16,000 being paid at one time, £24,000 at another, and again £48,000 on a third occasion; but always they returned to plunder and burn. At last the "Witan," or meeting of "wise men" of England, chose a Dane as king, and under Canute the land once again had peace.

During the eighteen years of his reign (1017–1035 A.D.) he did all he could to conciliate his English subjects; and on his death he was deeply mourned, for peace and prosperity had come with his reign.

Within a few years the kingship was restored to one of the line of the great Alfred. Edward, a Saxon, who had been educated in Normandy, where manners and customs were more refined than in his own land, was selected by the Witan. Coming to the throne with Norman prejudices and Norman tastes, he soon gave offence to the Saxons, for they saw all the important offices filled by Norman favourites.

The great Saxon leader of this time was Earl Godwin, and Edward, marrying the daughter of this great noble, practically gave the reins of government into the hands of Godwin. But a rupture soon came, for the Norman and Saxon parties could not long agree. The Saxons realised that William, Duke of Normandy, was making a bold bid for the throne in the near future; and they opposed this with all their might, naming Harold, the son of Earl Godwin, as their leader in the struggle, if struggle there was to be.

William had secured a promise from Edward that he should come to the throne; but this promise the king had no right to give, as all the kings were chosen by the Witan.

By accident Harold fell into the hands of the duke, who, by craft, secured Harold's promise also to help him to the throne.

On the death of Edward, William claimed the fulfilment of these promises; but Harold naturally opposed him. In the war which followed, Harold was slain at Hastings; and William, after defeating Edgar, who also claimed the throne, was named by the Witan as King of England. Thus his name has been handed down through the years as "William the Conqueror." So there commenced a fresh period of foreign rule for England, this time in the hands of the Normans.

Play VI.—The Oath of Harold.

CHARACTERS.

HAROLD, Earl of Wessex; WILLIAM, Duke of Normandy; OSRIC and GILBERT, two thanes of Harold's following; Saxon and Norman knights, priests, soldiers, etc.

SCENE I.—OUTSIDE WILLIAM'S PALACE IN NORMANDY.

The following should form a continuous action throughout the scene.

[*Knights, with their pages, pass to and fro; Norman men and women enter, greet one another, converse, and then pass out; occasionally a monk mingles with the crowd. Enter two Saxon thanes talking together.*

Gilbert. The wreck of our vessel has been most unfortunate, for not only will Earl Godwin be anxious as to the fate of our lord, the Earl Harold, but our own friends at home will fear for our safety. Meanwhile I am afraid that we are, more or less, prisoners of Duke William.

Osric. [*Stopping and turning quickly upon his friend*] How can you imagine such a thing? Ever since we have been at his court he has treated us with all courtesy, and we are free to come and go without hindrance.

Gilbert. [*Slowly*] Yes, 'tis true; but we are of little importance compared with Earl Harold, and he is the man whom William is trying to trap.

Osric. [*Heatedly*] Why should this be so? Earl Harold is known throughout Europe, and were William to treat him shamefully, the whole of Christendom would know of it and proclaim him a false knight.

Gilbert. [*Calmly*] Peace! peace! The duke is treating our lord with all honour; but he is wholly in William's power, although the captivity has a pleasant look. But here comes the earl! Let us question him and hear what he thinks.

[*Harold enters, walking moodily, and the knights move towards him with deference. The people stop and look towards him. As the knights stop before him he looks up.*

Gilbert and Osric. [*Speaking together*] Good-morrow, my lord!

Harold. [*Looking at Osric*] Whence this angry look, Osric?

Osric. My lord, we but talked of the Duke William's designs towards us all, and I did not quite agree with Gilbert.

Harold. [*Placing a hand upon each of the knight's shoulders*] Saxons in a Norman land must not disagree upon any subject. Would we were back in England, my lords, where speech need not be guarded or actions restrained; but in Normandy we must show a united front.

Gilbert. My lord, we are united in your service, but we grow homesick, and this inaction is irksome. Is there any likelihood of a speedy return home?

Harold. I trust it will not be long delayed, for I have spoken of it more than once to the duke. Yet if I persist in the question, he will believe that I weary of his kindness—for kind he has been to us all. But I would I was once more upon the sea, for I feel that I am not as free to choose my going as I would wish.

Gilbert. Is there no possibility of escape, my lord?

Harold. Escape? What mean you? William will allow us to go when he is ready, but I think that first he will require some service of me. His friendship is one that seeks payment for kindness, and I would I knew what payment he needed. Under the excuse of doing me honour, soldiers stand day and night at my door. My every action is observed, my every speech weighed; so important am I in the eyes of the duke.

Osric. My lord, step carefully, for England needs you.

Harold. [*Looking round and speaking quietly*] I much fear that William has need of England, and means to use me to obtain his desire. But we must not stand here, for already we attract attention, and I would not that William thought us discourteous or dissatisfied. Attend me, Osric; and do you, Gilbert, follow slowly and guard me.

Gilbert. [*Bowing*] You do me honour, my lord!

[*Harold passes on with Osric, whilst Gilbert stands watching them, and talking to himself, with his hand upon his sword.*

Gilbert. I am certain this Norman duke means harm to him: but if harm does come, Saxon steel shall shed Norman blood, and that I swear by all the saints!

[*Looks fiercely round him, and then follows in the wake of Harold and Osric.*

SCENE II.—THE COURTYARD OF WILLIAM'S PALACE.

[*A temporary altar, covered with a cloth, stands in the middle of the courtyard, with a priest before it. William is on one side, with his knights at the back of him; whilst Harold stands facing him on the other side, with his thanes grouped about him.*

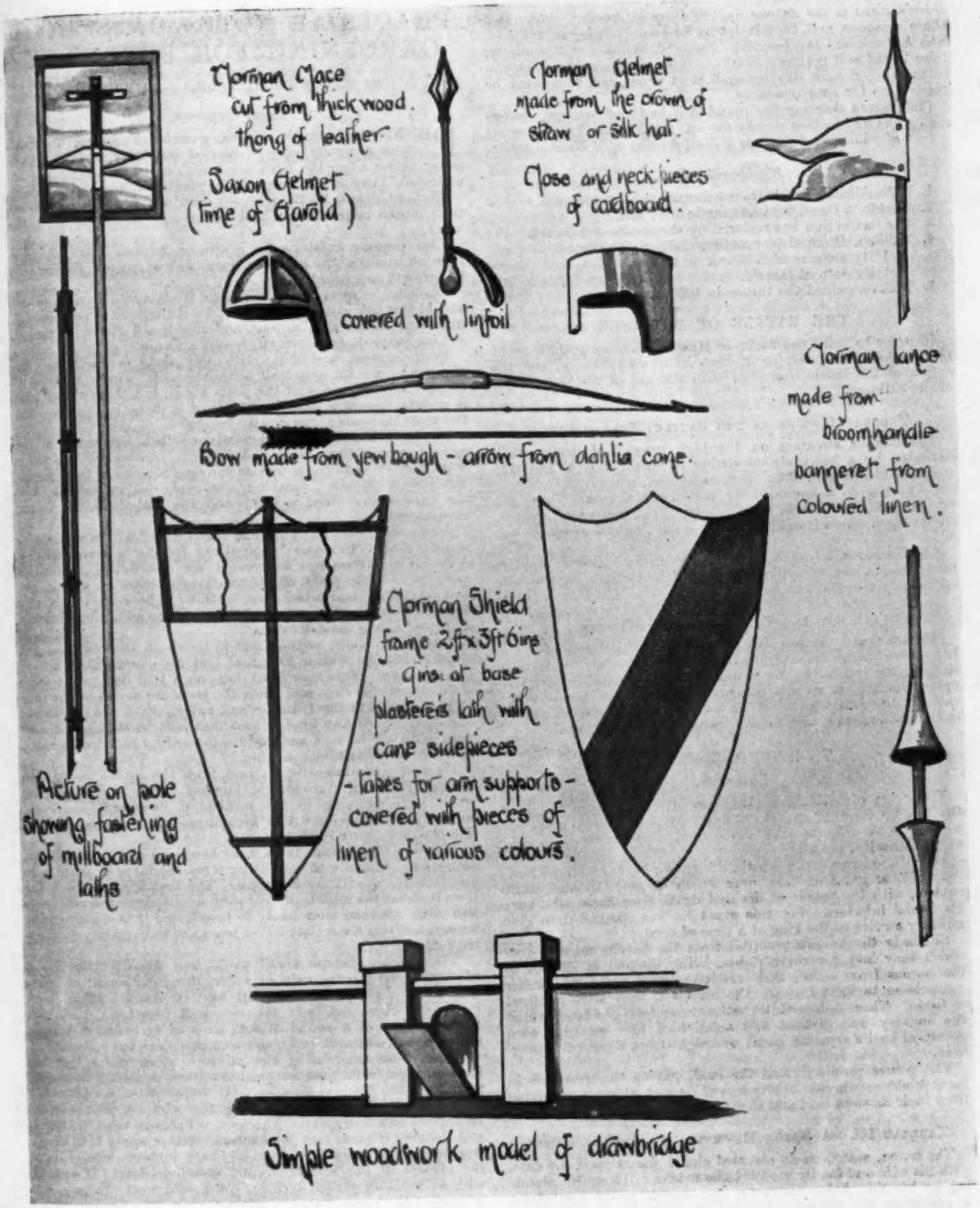
William. [*Speaking so that all can hear*] The saints have worked in my favour by bringing here as my guest you whom I delight to honour, the great Earl of Wessex. Cannot they further aid me, and delay your setting forth for some days?

Harold [*Warmly*] Nay, my lord duke, but I am anxious to return to my own land; for happy though you have made me here, yet a longing for home must come, and I fain would be gone before your kindness binds me for ever with links of love to Normandy.

William. [*Advancing towards Harold*] Be it so! Yet before you go you will not refuse to pledge me. I much desire your friendship, and would be certain that at any time I could command it. You have plighted your troth with my daughter, and, with the lands which she will bring to you, you will be a Norman lord, and as such owe me fealty. Swear, here and now, that you will be my faithful knight and aid my cause. Let such an oath be your parting gift, I beseech you.

[*As he says this he places his hands upon Harold's shoulders.*

Harold. My lord, if you so desire it, churlish would it be of me to refuse. Your kindness will be but poorly paid by such a pledge, for as one of your barons such is only your due. [*Harold*



goes forward to the altar, and, placing one hand upon it and looking towards the knights and thanes, speaks distinctly] I swear upon this altar that I will be your faithful knight, and will aid your cause whensoever you call upon my service.

[*Lifts his hands, and commences to walk towards the Saxon thanes. William steps in front of him, and, taking him by the arm, leads him back to the altar, removes the cloth, showing a box beneath. He raises the lid and turns to Harold.*

William. See, my lord! upon these holy relics you have sworn to help me to obtain my rights; such is the crown of England. [*Harold starts, and steps back a pace with his hand to his sword*] You cannot draw back, for these knights of mine are witnesses that the Earl of Wessex has sworn to be my man. And now, my lord, farewell.

Harold. [*Aside*] Trapped at last. [*The Saxon thanes commence to draw their swords amidst shouts of* Dastard; An unworthy

trick: False knight. *But the Norman knights step forward as Harold turns to the Saxons and holds up his hands.*] Put away those weapons, and, friends, let us be gone [*turning to William, who had rejoined the knights*]. Farewell, William of Normandy, false friend and perjured knight! You have caught me as you intended, but some day we shall meet again, and there may be repayment for your treachery.

[*The Saxon thanes gather round their lord and pass out, muttering and looking fiercely towards the Norman knights, many of whom stand silent as if disapproving of William's action.*

Blackboard Sketch.

1. With Alfred's death Danish invasions recommenced.
2. Canute, a Dane, became king in 1017 A.D.
3. The Saxon line was restored by the choice of Edward.
4. William, Duke of Normandy, claimed the throne.
   (*a*) By promise of Edward.
   (*b*) By oath of Harold.
5. William gained the throne in 1066 A.D.

THE BATTLE OF HASTINGS.

In order to make the battle of Hastings a more graphic event to the children, it can be divided into two tableaux, and the action of the battle described with the aid of the movements of the children.

Tableau I.—Before the Battle: Senlac Hill.

The Saxons standing on the high ground of Senlac Hill, defended by a barricade consisting of earth, stones, and tree trunks; pikemen in front, archers behind, and on the crest of the hill Harold surrounded by the Saxon thanes. These are armed with long swords, short-handled axes, and round shields. Above them waves Harold's banner—a fighting-man worked upon silk.

The Normans, advancing from below, in three lines; archers, men-at-arms, and heavily-armoured knights with long shields completely covering the body.

Tableau II.—The Victory of William.

Normans and Saxons lying huddled on the ground; the barricades broken down; piles of dead round the body of Harold, showing the last rally; the standard lying beneath them. Normans, leaning on swords or battle-axes, with William in the centre talking to a group of his barons. Saxon women coming in the distance to search for the bodies of their relations.

THE FEUDAL SYSTEM.

Summary.

The reign of William in England introduced into our land the Feudal System, a code of laws by which each man was subject to the class socially above him, with the fountain-head of all authority, the king.

Each baron received from the king, who was his feudal lord, "a fief," or grant of land, over which he had full and entire control, with the power of life and death over those who were his feudal inferiors. For this grant he was compelled to give military service to the king at a time of need.

Similarly the knights received from the barons estates over which they had governing rights, being themselves subject to the barons from whom they received their lands, and under compulsion to fight beneath the barons if they were required so to do. These nobles built castles throughout the land, whilst the country was divided and subdivided into sections, each governed by its separate baron or knight from a central stronghold.

The poorer people farmed the land, paying the overlords in farm produce; whereas others served as men-at-arms, receiving from their masters food and shelter in return.

Tableau III.—A Baron Receiving his Feudal Dues.

The baron, seated on an elevated chair, placed upon the dais, with his wife and family grouped about him. His squire, standing by his side, holds his sword and shield, whilst his helmet is placed on the ground. Knights are scattered about the hall, dressed in full armour, with swords by their sides. Men-at-arms stand on guard round the dais and at the doors of the hall. Farmers and the poorer people are massed at one end, carrying corn, hay, and straw, and general farm produce.

One person kneels before the baron, his head bowed and his two hands placed between the hands of his lord in the act of swearing the oath of allegiance. A pile of farm produce is lying on one side ready to be carried away into the castle granaries.

PRACTICAL NOTES ON SCHOOL GARDENING FOR FEBRUARY.

BY BRUCE COOK, F.R.H.S., CHINGFORD.

Fruit Culture.

PRUNING of currant bushes, gooseberry bushes, and fruit trees generally may be carried out in February. Only never prune when the trees are frozen or when hard frosts are expected. Any of the above can be planted in fine open weather.

Grafting should be thought out, and any trees to be grafted next month might be cut back this month in readiness for the work.

Also prepare cuttings for grafts or scions. They may be inserted in soil at the back of a north wall or fence. This retards the growth somewhat.

Cleansing of Fruit Trees by Winter Washing.—On no account should this operation be neglected, for if the bark is not cleaned, moss and lichen soon appear, and affords a harbour for thrups, codling maggot, apple weevil, woolly aphis, etc.

Fruit farmers, and those with only small orchards, are beginning to see the practical advantages of "winter washing;" for not only are many of the pests killed, but the yield of fruit is greatly increased thereby, the fruit is of better quality, and the trees themselves are greatly benefited.

Not only are the pests themselves killed, but many of the eggs of some of them are also destroyed. Authorities are somewhat divided as to the action on the eggs of some of these pests; but without doubt "spraying," as explained further on, kills the eggs of the "red spider" and the "apple sucker" and many aphides.

Anyhow, nothing but good can result from "winter washing;" and it should be made compulsory by the government, for orchards and trees not so treated are a breeding-ground for millions of these pests which commence action in spring, not only on the lazy man's trees, but on those of his more industrious neighbour; for these pests rapidly spread to adjoining orchards and those in the same district.

The old-fashioned method was to limewash the branches and trunk, and then scatter lime that had been just slaked among the branches. This should be done on a still day, when there is little wind blowing, and when the trees are moist, as the lime will then stick to the branches and twigs. Soot will do instead of slaked lime. Any lime or soot that falls on the ground near the trunks will be well washed into the soil by subsequent rains. This acts as an excellent manure.

We make the following extract from the leaflet issued free by the Board of Agriculture, London, S.W. Although they recommend spraying in the middle of February, we would suggest from experience two sprayings—one as recommended, and the other early in March.

"Caustic alkali wash has a most beneficial effect on both old and young orchards in which the trees are infested with moss and lichens, or with woolly aphis. The best time to spray the trees is about the middle of February, as the eggs of some insects and mites are then more likely to be affected than earlier in the winter, and it is not so late in the season as to harm any developing buds.

"To prepare caustic alkali wash, first dissolve one pound of commercial caustic soda in water, then one pound of crude potash (or "potashes," or pearl ash) in water. When both have been dissolved, mix the two well together; then add three-quarters of a pound of soft soap or agricultural treacle, stir well, and add sufficient water to make up to ten gallons."

Some recommend using the mixture when warm, but we have always found just as good results when used in a cold state.

Care should be used when using the mixture, which should be applied as a fine spray. The wash is liable to burn the hands and clothing if great care is not used. Never apply it in windy weather, as the spray is liable to be blown into the face or on to the clothes of the worker or any standing near. If applied with an ordinary garden syringe, you should wear rubber gloves to protect the hands from the solution.

But we can strongly recommend the "Abol" syringe, as it has a drip preventer, thereby keeping the hands dry. It also possesses other advantages in the shape of interchangeable nozzle, by which you apply the mixture in the form of a fine mist on the under side of the branches, as well as otherwise. It is the best general garden syringe we know, and costs very little more than an ordinary syringe. It can be obtained from Mr. E. H. White Beltring, Paddock Wood, Kent. For very tall standard trees and large orchards a knapsack sprayer must be used.

The "Eclair" knapsack sprayer (Vermorel's) can be obtained from Charles Clark and Co., 16*a* Bevis Marks, London, E.C. It can be easily managed, and has been awarded many prizes and medals. I have gone into this matter of spraying somewhat fully, as I feel certain all would benefit if "winter spraying" was more general, even when only a few trees and bushes are grown.

A Practical Lesson on "the Black-currant Mite."

This might be given on a wet afternoon. First procure some branches from the black-currant bushes with twigs, containing some very swollen or enlarged buds, and also a few twigs with buds of ordinary size. Explain how the presence of the black-currant mite causes the buds to swell.

Having arranged the class round the table, let each scholar cut through one of the swollen buds with a sharp knife. Place one half under the microscope, and stir up the centre with a long darning needle. Upon close examination with the microscope they will see that the swollen bud contains a number of white mites, which are busy feeding on the young leaves and blossoms. The irritation set up by these mites causes the buds to swell; and no blossoms or fruit can be formed from such buds. Leaves sometimes appear, but generally drop off. The black-currant mite cannot be seen by the eye, hence the use of a microscope in school work. The eggs of this pest are somewhat round, and are found abundantly in infected buds all the year round. After the bud shrivels up the mites probably stray about on the branches and twigs, and finally make their way into other buds.

Frost does not seem to kill these mites, as some buds that were frozen hard when cut from the bush were found to contain them busy at work.

This pest is a very difficult one to stamp out, and is often the cause of great loss to the fruit-grower.

Point out that you should never take cuttings from infested bushes.

Never purchase bushes containing very large round swollen buds.

Spraying may possibly do good in some cases; and where only a few bushes are grown, pick off the swollen buds as soon as they are seen and burn them.

Hard pruning has been tried with good results; in fact a ten-acre field of black-currant bushes on a fruit farm in Kent was so badly infested that it was almost decided to dig them up. They were, however, pruned hard back, and all the prunings collected and burnt, and in two or three years little currant mite was to be found. We tried with good results hard pruning on some trees badly attacked by the currant mite.

Copies of a leaflet on *The Black-currant Mite* (*Phytoptus ribis*) may be obtained free of charge from the Secretary, Board of Agriculture, 4 Whitehall Place, London, S.W.

"Touching up" the Grease Bands with Voss's Grease and Special Paper.

Grease bands on fruit trees should be looked over during February, and fresh grease applied to the band. This is most important. (See photo.)

Strawberry plantations may be made on richly-manured and deeply-dug ground. They will not do so well the coming season as those planted in September (*vide* that issue of *Practical Teacher*).

Varieties of Apples.

Those recommended for planting in school and small gardens for growing as bush-shaped trees should be obtained on the paradise stock. The following may be planted as close as eight feet apart.

Cooking Varieties.

Early White.—Nice shape and size. (Late July and August.)

Lord Grosvenor.—Large fruit. Free fruiting and reliable; highly recommended. (August and September.)

Stirling Castle.—Small, but fine flavour. Does well on a loamy or richly-manured soil. (October and November.)

Golden Spire.—Somewhat small, but bears well. (October and November.)

Warner's King.—Generally grown as a standard, but does well with me on a clay soil as a bush-shaped tree on the paradise stock. If thinned, specimens of this variety grow to a very large size. (November.)

Bramley's Seedling.—Does well on nearly all soils and situations. A general all-round variety, somewhat flat in shape, but keeps splendidly. (December.)

Eating Varieties.

Beauty of Bath.—Highly recommended, as it bears freely; nice sharp flavour. Colour green, veined with red streaks. (July and August.)

Mr. Gladstone.—Perhaps a little earlier than the preceding variety. Rather poor flavour, but of taking appearance, and being early sells well. (July and August.)

Worcester Pearmain.—Somewhat small fruits, but regular and prolific bearer. Fine colour when ripe. (September.)

Golden Nob.—An old favourite, of yellow colour (sometimes called yellow ingestrie). Bears well, but fruit is somewhat small. (October to November.)

Cox's Orange Pippin.—Should find a place in every garden. Splendid flavour, and keeps well. Is known as the "king of eating apples," and certainly deserves its name. (November to January.)

Scarlet Nonpareil.—Rather small fruit of nice colour. (December to February.)

Lady Sudeley.—Might be grown in the place of Worcester Pearmain, especially in sheltered districts. Only bear in mind that the fruit is produced at the extremities of the branches, and is liable to be blown off in gusty weather. Care should also be taken when pruning not to cut away the ends of the branches, where the fruit buds are mostly found.

The above varieties are recommended after trials extending over several years. A good plan is to make inquiries among fruit-growers in your immediate district, and grow varieties that have done well in your own locality. Or you might write to a good reliable firm of fruit-tree growers, mentioning the kind of soil and subsoil in your garden (also situation and slope of same), and ask them to recommend varieties.

Personally, we do not recommend the growing of "standards" in small gardens, as they are a longer time before they produce fruit, and must be planted about twenty-five feet apart. Not only so, but they are difficult to prune and spray, and the fruit can only be reached with a ladder.

Of course, in planting permanent orchards, by all means put in standards; but even then plant a few bush varieties, and compare results.

Varieties of Pears.

On shallow or clay soils plant bush trees on the "quince" stock; while on rich deep soils put in standards grafted on the "pear" stocks.

Summer Doyenné.—Is the earliest fruiting, and, although small, is a free bearer. (July and August.)

William's Bon Chrêtien.—Generally does well; fair size, peculiar flavour. (September.)

Louis Bon de Jersey.—Nice flavour, also good size and shape. (October.)

Pitmaston Duchess.—One of the largest, if not the largest. Free cropper, and good flavour. (October.)

If pear trees were more generally grown and trained against walls, good paying crops could be produced. We call to mind a schoolhouse that was planted in this manner years ago, and bushels of pears are picked yearly, especially as the pruning and manuring are carefully attended to.

Varieties of Plums.

Victoria.—This variety should find a place in all gardens. Its colour is pinkish red, and the egg-shaped fruit possesses a fine flavour, and is very juicy. Grand cropper, and is perhaps the most useful plum we possess. (September.)

The Czar.—A fine purple variety, and is a reliable cropper. Skin seldom cracks. Useful for dessert or cooking. (August.)

Monarch.—A very dark-coloured plum, somewhat round; blue colour; handy and reliable. (End of September.)

Rivers Prolific.—Very early plum (perhaps the earliest), somewhat small, but a fine cropper. Fine for dessert. (July.)

The above-named four varieties do well as bushes or standards, and are hardy and easily grown.

The following varieties are somewhat more tender, and do well when grown against fences or walls, especially as cordons:—

Coe's Golden Drop.—A yellow variety, large size, somewhat egg-shaped; does well on a fence or wall. (Late September.)

Transparent Gage.—Another yellow variety, often has spots of red; nice flavour; round in shape. (Early September.)

A Practical Lesson on the "Black-Currant Mite."

Jefferson.—Deserves a place in every garden. Large size. Fine for dessert (one of the best). Yellow, spotted red. (Early September.)

If the soil is deficient in lime, plums do not, as a rule, do well. This difficulty may be overcome by digging in plenty of old lime, rubble, mortar from ceilings, etc., before planting. You can obtain this cheaply when any old houses are being demolished.

Similar treatment of the ground is strongly recommended before planting cherries, as they also require abundance of lime in the soil.

Logan Berry.

One or two plants should be grown. The Logan berry is a cross between the raspberry and blackberry, and was introduced from America. It is hardy, and a splendid cropper. The fruit has a somewhat strong acid flavour if picked before perfectly ripe.

Cherries.

One or two should be grown. They seldom do well if the soil is deficient in lime. On soils containing little lime dig in plenty of old mortar rubble before planting.

Bigarreau Frogmore.—Does well with us, trained to a close fence. Colour pale yellow and red. Ripens early in July.

Early Rivers.—Black; does better against a wall. Ripens middle of June in warm position.

Morello.—Fruits well as bush or on north wall. This is the well-known culinary cherry. Ripens July to August.

Strawberries.

A few should be grown in the demonstration plot in every school garden, or, where possible, a half a dozen runners should be planted in each plot.

There are many good varieties, but after growing most we recommend:—

Royal Sovereign.—Good size and cropper; fine flavour; nearly always does well.

The Saxon.—Raised about eight or nine years ago. Brighter in colour and nicer shape than Royal Sovereign.

Waterloo.—One or two plants should be grown, as it is nearly black; very late, although an excellent cropper and fine flavour.

Raspberries.

The best all-round variety to grow is Superlative, as it does well in nearly any position. Although moist rich soil is most suitable for producing large raspberries, still, even in ordinary garden soil, good crops can be produced if the canes are well mulched with old rich manure, and watered in dry hot weather.

Currants.

One or two bushes might be grown to illustrate the growth and pruning of red currants, which differ entirely from black currants. When pruning red and white currants you cut away the new growths to within three inches, as the fruit is always produced on spurs on the old wood. Black currants, on the other hand, produce fruit on the new young wood; so that in pruning black currants you should be most careful not to cut out any new wood.

Baldwin.—Is a good black variety.

Raby Castle.—A fine red currant.

White Dutch.—Is the best of the white varieties.

Gooseberries.

Gooseberries do well in nearly any garden soil if well mulched and pruned.

If you are planting a dozen bushes, put in three of a red variety, three of a yellow, and three each of a green and white, and leave the selection to the nurseryman supplying the bushes.

Flower Culture.

Peonies may be planted in richly-manured ground. Where there are very large clumps, dig them up, divide with a sharp knife, and replant.

Sweet peas may be sown in pots, and put in a cold frame for planting out later. But we have found that planting direct into the prepared soil in February is productive of good results, as long as they are protected from birds, slugs, and mice.

In open weather Virginia creepers, roses, pansies, violas may be planted in prepared well-drained soils.

Briers, for budding in July, should be planted in rows two or three feet apart, allowing two feet between each brier. In order to encourage growth, mulch the ground between with manure to the depth of an inch or so.

Dahlia tubers might be looked over to see if any are decaying. If there are, remove them at once before they infect the others.

Pinks and carnations should be looked over and the surface lightly stirred with a hand-fork. Any decayed leaves on the carnations layered last August might be cut off with scissors. Soot can with advantage be scattered lightly over the foliage. This will keep the birds away from the young centre growths, of which they are very fond. Or black cotton can be stretched across at intervals if the birds are very troublesome.

Bulbs growing in the borders might receive a mulching of cocoa-nut fibre or short manure.

Seeds of all kinds should be ordered in February and early March.

Vegetable Culture.

Shallots should be planted in rich soil. They should be planted in rows eighteen inches apart, and, say, a foot between each. Pick out the largest, best-shaped bulbs, and just press the bulb firmly into the soil (when the surface soil is dry), so that the growing point is just visible. Shallots should find a place in every garden, as they are one of the best paying and most useful crops grown, and are easy of culture.

Rhubarb roots, if old, may be divided in the following manner:

First dig up the roots very carefully, and note where the eyes (or the growing points) are. Then with a sharp knife cut the root into pieces, each piece containing one or two eyes. The lads in the picture made nine nice pieces from one old clump. Then prepare a piece of ground by digging at least eighteen inches, and working plenty of well-rotted horse manure into the same. Allow not less than two feet from root to root, and plant so that the bud just shows above the ground. Cover with at least two inches of strawy manure. Old clumps should be divided about every fifth year. Rhubarb can also be raised from seed. We will touch on this in March.

Parsnips may be sown, and also broad beans; but I doubt if there is any advantage gained by sowing them before March.

Seed potatoes, or *sets* as they are sometimes called, may be placed "eye end up" in boxes containing peat moss or cocoa-nut fibre.

Ground for root crops, excepting perhaps turnips, should, if possible, be light, deep, and sandy, as better-shaped roots are produced on such soils.

Should the soil be of a clayey nature, prepare it as early as possible in February (if not treated, as advised, by autumn cultivation) by digging in plenty of road sand and sifted ashes, etc., as this lightens the soil. On no account apply farmyard

manure in spring to ground in which you propose growing parsnips, carrots, or beet. If you do, the roots will, in most cases, become forked, as in the photo.

We tried both methods in order to give the lads a practical ocular lesson.

Our soil is a dense clay. One piece of ground was thoroughly worked by autumn cultivation and ridging. The other piece was manured with farmyard manure, and dug over in early spring. Seeds from the same packet were sown in each plot. Upon digging the parsnips most of those from the ground prepared in the autumn were similar to the fairly good-shaped one in the picture; while, on the other hand, nearly every one grown on the land manured just before sowing the seed was "forked." A practical lesson like this is seldom forgotten by the lads in after life.

Of course the presence of the tape measure in the photo is self-explanatory.

Answers to Correspondents.

A. K., Certificate, and Philip G.—I find that the information you require has appeared in previous numbers of the *Practical Teacher*, so please refer to back numbers.

Man of Kent and T. S.—As you are both going to have such large pieces of ground for your school gardens, plant plenty of fruit trees. I would not recommend standard trees of apples. Of course you might plant one or two.

A Beginner, Rural, C. M., and Over Fifty.—No inspector or official will expect too much of your class the first year or so. Yes; school gardening is being taken up in "urban schools" as well as in "rural" ones.

Boiler.—Try the Let-U-Sleep boiler. You can obtain it from the Marathon Boiler Company, Balham, London, S.W.

Miss K. and Ovid.—Take my advice and wear thick boots with cork socks, or, better still, clogs lined with felt. I have had a pair of the latter in use for over seven years. Try a pair, and write for them direct to 4 Wellington Street, Glasgow. They would no doubt supply them in dozen lots cheaply for the children.

"Land O."—I told you they would. As to the other matter, try them and see. In a large school like yours you might have two or even three classes if you can obtain the ground, especially as you are "gone" on the subject. I knew you would by the tone of your letter in May last.

N. B. C.—Try Dobbie and Co. They are a good, reliable firm, and now hail from Edinburgh.

N. B., Laddie, Scotia, and G. Mc.—As you all live in Scotland, write to the reliable Scotch firm of Dobbie and Co., Edinburgh. I can recommend them from experience. "G. Mc." will no doubt be surprised to hear that in the districts under the Glasgow and Edinburgh colleges about 140 school gardens have been started during the past two years; so I am informed.

Nattie.—Write and ask your local H. M. Inspector.

Leek.—Yes, certainly. Before sending me twenty-seven questions to answer, please look up the back numbers of the *Practical Teacher*. They can be obtained from 35 and 36 Paternoster Row. Then write again by all means.

Amo and Billy.—Write to T. W. Sanders, Editor of *Amateur Gardening*, a weekly paper that all interested in gardening will do well to read.

Dalesman.—Yes, certainly.

J. W.—Thanks for photo. Your other questions will be dealt with month by month.

Cleveland.—A frame would perhaps answer as well. Put down a few "cloches" on your next requisition list, one for each lad. There are several firms that supply them. Write for particulars to the French Cloche Co., Caxton House, Westminster, mentioning the *Practical Teacher*.

Secretary and L. K. K.—I can strongly recommend Gamage of Holborn, and they could supply at once.

H. K.—Yes.

Assistant.—I will send you particulars as soon as possible.

Brum, Essex, and Beginner.—A list of fruit trees and bushes, etc., suitable for school gardens appears in this issue.

Special Notice.—All letters containing any doubts or difficulties must reach me not later than the fourth of the month, in order that answers can appear in the following month's issue of the *Practical Teacher*. In future no answers will be sent by post, unless a stamped and directed envelope is enclosed.

I have received copies of seed catalogues from Dobbie and Co., Edinburgh; Webb and Sons, Stourbridge; and Gamage's, Holborn. They are all good, reliable firms, and I can from experience recommend them all.

THE EDUCATION OF CONVICTS.

In connection with the education of both convicts and inmates of the Borstal Institutions a novel experiment is being carried out by the Home Office. Early last February the International Correspondence Schools of London were permitted by the Prison Commissioners to undertake the tuition by correspondence of certain inmates of one of the Borstal Institutions, in order that the authorities might obtain some idea of the value of correspondence tuition as applied to our prison population. The results of that preliminary experiment have been such that the International Correspondence Schools have just received a letter from the Secretary of the Prison Commissioners, stating that they are prepared to go further into the matter, and to place certain convicts and lads in the Borstal Institutions under the tuition of the schools. The persons on whom this fuller experiment will be tried will be those whose general aptitude and length of sentence will permit of their finishing their courses before being released. The experiment, so far as it has gone, has, we understand, been watched with great interest by the prison authorities, and that they have determined to go more deeply into the matter is a striking tribute to the efficacy of correspondence instruction, and especially that of the I.C.S., whose work is now so well known to readers of the *Practical Teacher*.

Our Query Column.

SOLUTIONS BY A. CLEMENT JONES, M.A., PH.D., SENIOR MATHEMATICAL MASTER, BRADFORD GRAMMAR SCHOOL.

RULES.

1. Each correspondent is restricted to *one* question.
2. Each query must be accompanied by the name and address of the correspondent, and the *coupon* which appears on the back wrapper of the current number of the Journal.
3. CORRESPONDENTS MUST IN ALL CASES STATE THE SOURCE FROM WHICH THEIR QUERY HAS BEEN OBTAINED.

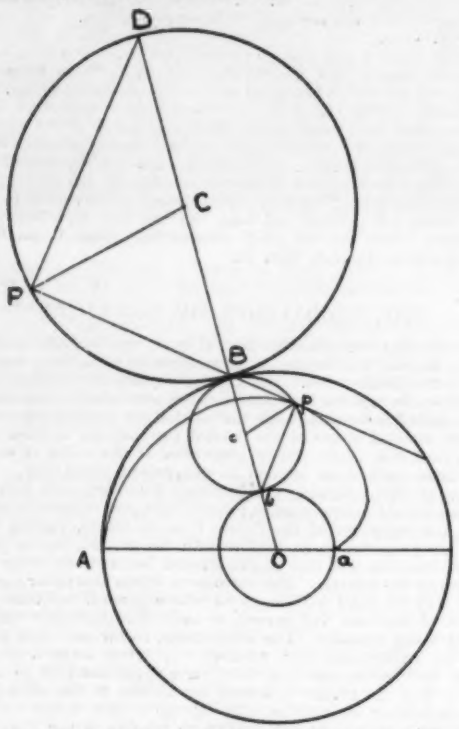
The Editor reserves to himself the right to decline to answer any question which is, in his judgment, unsuited to the Magazine.

A NEW STENCIL FOR DRAWING MATHEMATICAL DIAGRAMS.—Mr. J. T. Dufton, a son of Dr. A. Dufton, one of H.M. inspectors of secondary schools, has invented an ingenious stencil for drawing conic sections. It is published by Macmillan and Co. at 1s. 6d., and should be very useful to mathematical students. It enables them to draw a correct figure, which is often half the battle when solving a problem. With this stencil we can draw a parabola, an ellipse, a hyperbola, and a rectangular hyperbola; and in each case the focus, latus rectum, axes, and directrix can be at once drawn, and the asymptotes of the hyperbolas. Further, the two ellipses and two hyperbolas given can be readily drawn with the same foci and axes, thus giving a confocal system. In addition, one of the two parabolas given is plotted on centimetre paper, and the other on one-inch graph paper. The graduations are shown on the stencil, and these parabolas ($y^2 = 4x$) can thus be used on squared paper for solving quadratic equations graphically. The stencil is made of celluloid, and measures only 3 inches by 6 inches. We thoroughly recommend it.

Augustus.—A cardioid can be generated as the locus of a fixed point on the circumference of a circle as this circle rolls on an equal circle.

(i.) Show that the evolute of the cardioid is a cardioid of one-third the dimensions and turned in the opposite direction.

(ii.) Show that the whole length of the arc of a cardioid generated by a circle of diameter a is $8a$.



(i.) Let the circle BPD roll round the equal circle whose centre is O and radius OA. Suppose the point P is at A, where the circle commences to roll; then A is the cusp of the cardioid generated by P. Since B (the point of contact of the circles) is the instantaneous centre of rotation, PB is the normal at P to the cardioid. Hence PD is the tangent, for BPD = a right angle.

Draw a circle centre O and radius $\frac{OA}{3}$, and let it cut OB at b. Make $bc = Oa$. $\therefore Bc = Oa$ also. Draw a circle centre c and radius cb, and let it cut PB again at p.

Join PC, pc, bp.

Now the arc BP = arc BA.

$\therefore \angle AOB = \angle PCB$.

Hence $\angle aOb$ = supplement of $\angle AOB$.
= supplement of angle PCB.
= twice $\angle PBC$.
= twice $\angle cBp$.
= $\angle bcp$.

Thus the arc bp = arc ab, and p is a point on the cardioid generated by the point p on the circle bpB, which rolls on the circle of radius Oa; and a is the cusp of this cardioid.

As shown above, pb is the normal and pB the tangent at p to this cardioid.

Hence the small cardioid (half of it is shown in the figure) is the envelope of the normal of the large cardioid—that is, is its evolute. The small cardioid is clearly one-third the dimensions of the large, and turned the opposite way.

(ii.) The radius of curvature of the cardioid at P is Pp. Let $OA = \frac{a}{2}$. $\therefore Aa = \frac{2a}{3}$. Hence the radius of curvature at A is zero, and when the circle C has rolled halfway round the circle O, the point P is distant $2a$ from A, and therefore $2a - \frac{2a}{3} = \frac{4a}{3}$ from a. Thus the radii of curvature at the point A and at a point halfway round the cardioid differ by $\frac{4a}{3}$. The length of the corresponding part of the evolute—that is, half the small cardioid—is therefore $\frac{4a}{3}$. The whole length of the small cardioid is then $\frac{8a}{3}$, and therefore of the large cardioid $8a$.

Bowling.—Show that

$$(x+2)^{n-1} + (x+2)^{n-2}(x+1) + (x+2)^{n-3}(x+1)^2 + \ldots + (x+1)^{n-1}$$
$$= nx^{n-1} + \frac{n(n-1)}{1.2} \cdot x^{n-2} \cdot 3 + \frac{n(n-1)(n-2)}{1.2.3} \cdot x^{n-3} \cdot 7 + \ldots + nx(2^{n-1}) + (2^{n-1}).$$

(Board of Education, Stage III., 1897.)

By division

$$\frac{a^n - b^n}{a-b} = a^{n-1} + a^{n-2}b + a^{n-3}b^2 + \ldots + b^{n-1}.$$

Put $a = x+2$, $b = x+1$; thus $a - b = 1$, and

$$(x+2)^n - (x+1)^n = (x+2)^{n-1} + (x+2)^{n-2}(x+1) + (x+2)^{n-3}(x+1)^2 + \ldots + \ldots + (x+1)^{n-1}$$
= left side of given identity.

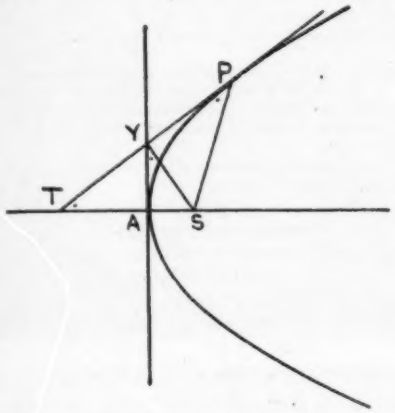
But
$$(x+2)^n - (x+1)^n = \left\{x^n + n \cdot x^{n-1} \cdot 2 + \frac{n(n-1)}{1.2} \cdot x^{n-2} \cdot 2^2 + \frac{n(n-1)(n-1)}{1.2.3} x^{n-3} \cdot 2^3 + \ldots + nx \cdot 2^{n-1} + 2^n\right\}$$

$$-\left\{x^n + nx^{n-1} + \frac{n(n-1)}{1.2}x^{n-2} + \frac{n(n-1)(n-2)}{1.2.3}x^{n-3} + \ldots + nx + 1\right\}$$

$$= n \cdot x^{n-1} + \frac{n(n-1)}{1.2} \cdot x^{n-2} \cdot 3 + \frac{n(n-1)(n-2)}{1.2.3}x^{n-3} \cdot 7 + \ldots + nx(2^{n-1} - 1) + 2^n - 1$$

= right side of given identity.

Westoe.—If P be any point on a parabola whose focus is S, the circle whose diameter is SP will touch the tangent at the vertex of the parabola. If P is without the parabola, then the circle whose diameter is SP will cut the tangent in two real points.



Draw the tangent at P, cutting the tangent at the vertex and the axis respectively at Y and T. Join SY; then SY is perpendicular to PT.

Since SP = ST, $\angle SPT = \angle STY$

= complement of $\angle AYT$

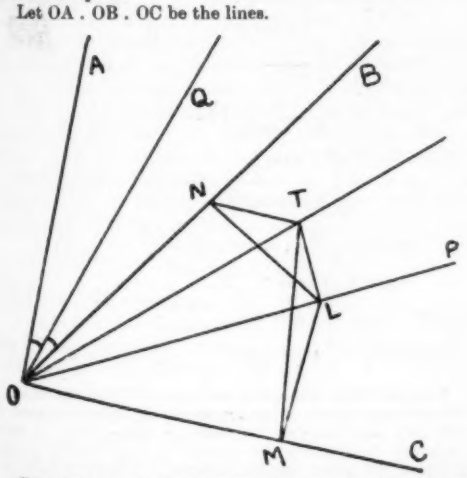
= $\angle SYA$.

∴ AY is the tangent at Y to the circle SYP on SP as diameter.

If P lie without the parabola as at P^1, the circle on SP^1 as diameter lies outside the circle SYP; ∴ cuts AY in two real points.

Sinew.—Draw a straight line which shall be equally inclined to three given straight lines which meet at a point, but are not all in the same plane.

Let OA . OB . OC be the lines.



Bisect the angle BOC by the line OP in the plane BOC, and the angle AOB by the line OQ in the plane AOB. Draw planes through OP and OQ perpendicular respectively to the plans BOC and AOB, and let OT be their line of intersection.

Draw TL perpendicular to OP; then TL is perpendicular to the plane, BOC being a line in the plane TOP.

Draw LM, LN perpendicular to OC and OB.

Then in triangles LOM, LON we have

$\angle LOM = \angle LON$; $\angle LMO = \angle LNO$; OL common.

Hence OM = ON, and LM = LN.

Again in triangles TLM, TLN.

LM = LN, LT is common, $\angle NLT = \angle MLT$ (both right angles).

Hence TM = TN.

Lastly, in triangles TON, TOM,

OM = ON, TM = TN; OT is common.

Therefore $\angle TOM = \angle TON$;

that is, OT is equally included in OC and OB.

Similarly, it is equally inclined to OA and OB; therefore, etc.

J. T. Williams.—The Editor is much obliged for your letter of appreciation. Your queries, however, rather overestimate his capacity. He is not a walking encyclopædia of general mathematical knowledge.

(i.) Forsyth's *Theory of Functions* is a standard work. It is very difficult reading; it consists of 700 large pages, and costs 30s. "Morley and Harkness" book I have not seen.

(ii.) The "finest work" is by Bertrand. A copy might be obtained for £20 or so. I have not seen Rice's book.

(iii.) The formulæ are best taught in words. Thus, difference of cosines is twice the sine of semi-sum × sine of semi-difference, with a special note on this exceptional case.

Rugeley.—Prove by summation that

$$\int_a^b \frac{dx}{\sqrt{x}} = 2(\sqrt{b} - \sqrt{a}).$$

Now $$\frac{(a+h)^{\frac{1}{2}} - a^{\frac{1}{2}}}{ha^{-\frac{1}{2}}} = \frac{a}{h}\left\{\left(1 + \frac{h}{a}\right)^{\frac{1}{2}} - 1\right\}$$

$$= \frac{a}{h}\left\{1 + \frac{h}{2a} + \ldots - 1\right\} = \tfrac{1}{2},$$

when h is very small.

Writing $a + h$, $a + 2h$, ... for a in this result, we have, when h is small,

$$\frac{(a+h)^{\frac{1}{2}} - a^{\frac{1}{2}}}{ha^{-\frac{1}{2}}} = \frac{(a+2h)^{\frac{1}{2}} - (a+h)^{\frac{1}{2}}}{h(a+h)^{-\frac{1}{2}}} = \frac{(a+3h)^{\frac{1}{2}} - (a+2h)^{\frac{1}{2}}}{h(a+2h)^{-\frac{1}{2}}}$$

$$= \ldots\ldots = \frac{(a+nh)^{\frac{1}{2}} - (a+\overline{n-1}h)^{\frac{1}{2}}}{h(a+\overline{n-1}h)^{\frac{1}{2}}} = \tfrac{1}{2}.$$

Hence

$$\frac{(a+nh)^{\frac{1}{2}} - a^{\frac{1}{2}}}{h\{a^{-\frac{1}{2}} + (a+h)^{-\frac{1}{2}} + (a+2h)^{-\frac{1}{2}} + \ldots + (a+\overline{n-1}h)^{\frac{1}{2}}\}} = \tfrac{1}{2},$$

when h is very small.

But $$h\{a^{-\frac{1}{2}} + (a+h)^{-\frac{1}{2}} + \ldots + b^{-\frac{1}{2}}\} = \int_a^b \frac{dx}{\sqrt{x}},$$

when h is very small.

Hence $$\int_a^b \frac{dx}{\sqrt{x}} = 2\{(a+nh)^{\frac{1}{2}} - a^{\frac{1}{2}}\}$$

$$= 2\{b^{\frac{1}{2}} - a^{\frac{1}{2}}\}.$$

K. Krishnamacharya.—I agree with the readers of the *Madras Educational Review* in considering your problem insoluble. Note that the triangles do not get continuously less, and consequently one would hardly expect to find an expression for their sum. In general the angles of the n^{th} pedal triangle are not expressible simply, for the angle A_1 of the first pedal, for example, is $\pm$ (B + C − A), according as A is < or > (B + C).

The problem leads to nothing, and is certainly not worth any considerable effort. Our column is intended to help students who cannot otherwise get assistance, rather than to solve original problems. *Vide* the rules.

Cæsar.—Five ladies, accompanied each by her daughter, purchased cloth at the same shop. Each of the ten bought as many feet of cloth as she paid farthings per foot. Each mother spent 8s. 5¼d. more than her daughter. Mrs. Robinson spent 6s. more than Mrs. Evans, who only spent about a quarter of what Mrs. Jones did, while Mrs. Smith spent most of all. Mrs. Brown bought 21 yards more than did Bessie, one of the girls, while of the other girls Annie bought 16 yards more than Mary, and spent £3, 0s. 8d. more than Emily. The other girl's Christian name was Ada. What was her surname?

(Workman's *Arithmetic.*)

Most of the information is quite superfluous. Ada's surname can be tracked down as follows:—

Let x be the number of feet any one mother bought, and y the number of feet her daughter bought. They spent respectively then x^2 and y^2 farthings. Evidently x and y are whole numbers.

Now 8s. 5¼d. = 405 farthings;

hence $x^2 - y^2 = 405$

$= 1 \times 405, 3 \times 135, 5 \times 81, 9 \times 45, 15 \times 27.$

Possible solutions are then

$x - y = 1, 3, 5, 9, 15.$

$x + y = 405, 135, 81, 45, 27.$

Hence for

A mother, $x = 203, 69, 43, 27, 21$ feet of cloth.

Her daughter, $y = 202, 66, 38, 18, 6$ feet of cloth.

The pairs of answers correspond to a mother and daughter. We only require to assign the answers corresponding to Ada and her mother.

(i) Mrs. Brown bought 21 yards—that is, 63 feet more than Bessie. The only values of x and y which differ by 63 are 69 and 6.

∴ Mrs. Brown bought 69 and Bessie 6 feet of cloth.

(ii) Annie bought 16 yards—that is, 48 feet more than Mary. The only values of y which differ by 48 are 66 and 18.

∴ Annie bought 66 and Mary 18 feet of cloth.

(iii) Annie bought more than Emily. ∴ Emily must have bought 38 feet—the only answer less than 66 left.

(iv) Ada consequently bought 202 feet.

(v) Mrs. Smith spent most of all; therefore she bought 203 feet.

But the answers 203, 202 correspond to mother and daughter.

∴ Ada's surname was Smith.

The other ladies can be fixed up as follows:—

(vi) Mrs. Evans spent about a quarter what Mrs. Jones did, and therefore bought about half as many feet of cloth. Hence Mrs. Jones bought 43 feet and Mrs. Evans 21 feet. This leaves the answer 27 for Mrs. Robinson.

The girls were then Ada Smith, Annie Brown, Emily Jones, Mary Robinson, Bessie Evans. There is an old Dutch problem of a similar character given in Hall and Knight's *Higher Algebra*. In that problem the data are only just sufficient.

Randall.—Find the condition that the conics

$$ax^2 + by^2 = 1,$$
$$a'x^2 + b'y^2 = 1,$$

shall cut orthogonally.

Let them cut at the point (x_1, y_1). The tangents to the conics at this point are

$$axx_1 + byy_1 = 1,$$
$$a'xx_1 + b'yy_1 = 1,$$

and these are perpendiculars of

$$aa'x_1^2 + bb'y_1^2 = 0. \quad \ldots\ldots\ldots \text{(i)}$$

Since (x_1y_1) is on both the conics,

$$ax_1^2 + by_1^2 = 1,$$
$$a'x_1^2 + b'y_1^2 = 1.$$

Hence $$\frac{x_1^2}{b - b'} = \frac{y_1^2}{a' - a}.$$

Substitute in (i) and we get

$$aa'(b - b') = bb'(a - a'),$$

the required condition.

A large number of the exercises in this book do not require the use of the calculus. You can suppose here we found the condition for perpendicularity by calculating $\left(\frac{dy}{dn}\right)$ for each conic.

Rugeley.—O, S are fixed points, a, b fixed straight lines. A line through O meets a at P, b at Q. Through Q is drawn a parallel to SP. Show that this parallel touches a fixed parabola.

Let $P_1, P_2, P_3 \ldots$ be a series of points on the line a. Project these from O to the line b, forming the range $Q_1, Q_2, Q_3 \ldots$ Again project $P_1, P_2, P_3 \ldots$ from S to another line c, forming the range $R_1, R_2, R_3 \ldots$ Now the ranges $Q_1Q_2Q_3 \ldots$, $R_1R_2R_3 \ldots$ are projective, for

$$\{Q_1Q_2Q_3Q_4\} = O\{Q_1Q_2Q_3Q_4\}$$
$$= \{P_1P_2P_3P_4\} = S\{P_1P_2P_3P_4\}$$
$$= \{R_1R_2R_3R_4\}.$$

∴ the envelope of the joins of corresponding points (for example, Q_2R_2) is a conic touching the base lines b and c.

Now let c be the line at infinity; then QR meets SP at infinity—that is, QR is parallel to SP. Since the envelope touches the line at infinity, it is a parabola.

Dai Lossin.—If the prices of two trees containing p and q cubic feet of timber be a and b, find the price of a tree containing r cubic feet, the values of the timber and bark being respectively proportional to the m^{th} and n^{th} powers of the quantity of timber in a tree.

Let the price of a tree be x when it contains y cubic feet of timber. Then we are told

$$x = A \cdot y^m + B \cdot y^n,$$

where A and B are constant quantities.

Applying the cases given, we have

$$a = A \cdot p^m + Bp^n,$$
$$b = Aq^m + Bq^n,$$

whence $$A = \frac{a \cdot q^n - bp^n}{p^mq^n - p^nq^m}, \quad B = \frac{bp^m - aq^m}{p^mq^n - p^nq^m}.$$

The required price, when $y = r$, is therefore

$$A \cdot r^m + B \cdot r^n$$
$$= \frac{(aq^n - bp^n)r^m + (bp^m - aq^m)r^n}{p^mq^n - p^nq^m}.$$

D'Arcy.—Integrate

$$\int \sqrt{\frac{1 + \sin x}{1 - \sin x} \cdot \frac{2 + \sin x}{2 - \sin x}} \cdot dx.$$

(Edwards's *Calculus.*)

Let $\sin x = 2 \cos y.$

∴ $\cos x\, dx = -2 \sin y\, dy,$

and the integral becomes

$$-\int \sqrt{\frac{1 + 2\cos y}{1 - 2\cos y} \cdot \frac{1 + \cos y}{1 - \cos y}} \cdot \frac{2 \sin y\, dy}{\sqrt{1 - 4\cos^2 y}}$$

$$= -\int \frac{2 \cot \frac{y}{2} \cdot \sin y \cdot dy}{1 - 2\cos y}$$

$$= -\int \frac{2 + 2\cos y}{1 - 2\cos y} \cdot dy$$

$$= \int \left\{1 - \frac{3}{1 - 2\cos y}\right\} dy$$

$$= y + 3\int \frac{\sec^2 \frac{y}{2}}{1 - 3\tan^2 \frac{y}{2}} \cdot dy$$

$$= y + \int \frac{dz}{\frac{1}{3} - z^2}, \text{ where } z = \tan \frac{y}{2}$$

$$= y + 2\sqrt{3} \tanh^{-1} \sqrt{3}z.$$

Now $$y = \cos^{-1} \frac{\sin x}{2}.$$

$$\therefore \quad = \cos^{-1} \frac{\sin x}{2} + 2\sqrt{3} \tanh^{-1} \left[\sqrt{3} \cdot \tan \tfrac{1}{2}\left\{\cos^{-1} \frac{\sin x}{2}\right\}\right].$$

Your solution was quite correct. If you use the logarithmic equivalents of the inverse hyperbolic functions, you will find your answer the same as that given. I should naturally have given the answer in logarithmic notation had you not given the one desired. The hyperbolic notation is on the whole a mistake, and does not simplify the work materially. In this case, if you try to find the value of the integral between, say, 0 and $\frac{\pi}{2}$, you will have to translate the result into logarithms.

Our Needlework Column.

BY J. A. FLEMING, AUTHORESS OF "COMMON-SENSE NEEDLEWORK."

COMMON-SENSE COMFORTABLE CLOTHING FOR CHILDREN.

Doll's White Skirt.

THIS is similar in construction to that of the flannel petticoat, only, being composed of calico, the sewing is different. The garment is rather larger than the flannel one, which will be given later.

The skirt itself is 6½″ by 18″, and the frill 2″ deep, including the lace.

Join halfway up the back by a run-and-fell or seam-and-fell.

Make a narrow hem on each side of the vent.

Make the band 1″ longer than that of the flannel petticoat, and set it on in the same way.

Frill.—This is 2″ by 26″. Join it by the same kind of seam as the skirt, and make a narrow hem along one edge. The lace may be omitted if preferred, or it may be from ¼″ to 1½″ wide. It must be as long only as the frill itself, as it is put on quite plainly.

It may be either run on the right side or seamed on the wrong side by the method already described.

The frill is pleated in same way as combination frill.

Turn up the raw edge of the skirt on the *right side*.

Lay the frill over it, making the seams meet each other. Let out or take in the pleats to fit the skirt.

Tack the two together.

Lay a row of feather-stitching galloon over the raw edges. Hem each edge down neatly.

Doll's Stays.

Take an oblong of paper 3½″ by 11″.

Double it three times across the top, which is selvedge way of the material, thus making eight divisions (Fig. 1).

Double it twice down the side.

Mark the corners A, B, C, etc.

From A mark E ½ down.

From A mark F 1½ in.

Join E and F by a straight line.

From A mark G 2 in and 1 down.

From A mark H 2½ in.

Draw a curve from F to H, passing through G.

From B mark I 4 in and ½ down.

From B mark J 2½ in.

Draw a curve from H to J, passing through I.

From B mark K 2 in and 1 down.

From B mark L 1½ in.

Draw a curve from J to L, passing through K.

From B mark M ½ down.

Join L and M by a straight line.

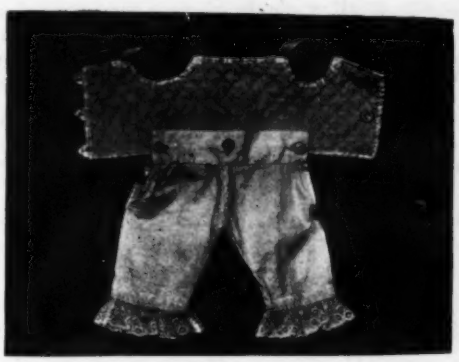
One model was made up in white satin stitched entirely by machine, and the other was made in flannel sewn by hand.

Children's stays are usually made of jean or drill, or something equally firm and strong, lined with calico, and having an interlining of cotton wool. They are first quilted, and then bound round with galloon, ribbon, or tape.

Quilting is a series of lines or stitches run by hand or stitched by machine, worked first in one direction and then in another, at right angles with the first, diagonally, so as to form diamonds.

A little garment of this kind would form admirable practice for a girl who is learning to work the sewing-machine, as by its means her eye would be trained in accuracy at the same time that her hand is gaining power to guide the machine.

At first the lines could be creased, tacked, or marked lightly in lead pencil; but the worker should early learn to depend on her eye alone for correctness, and she should discard any kind of support as soon as possible. Diagram 2 shows the lines taken across in one direction and commenced in the opposite direction. These are

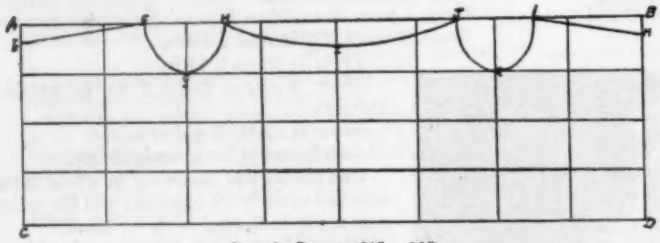


continued until the whole area is covered with diamond shapes.

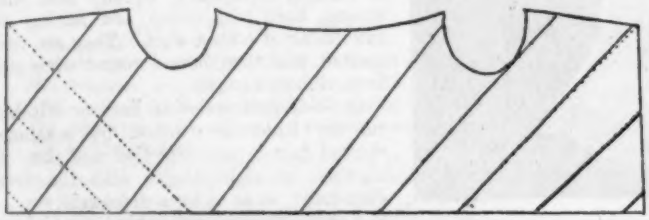
Part of the attractive appearance of quilting is due to the centre of the diamonds being raised above the rows of stitching. This could not be produced by running on single calico, or even on *double* calico, without an interlining of cotton wool between the two. That would be rather difficult for such young children as those for whom the lesson is intended.

A very satisfactory result can be obtained by running two thicknesses of *flannel*, as will be seen in the photo-

graph, which was worked entirely by a child between nine and ten years of age. Galloon, ribbon, or tape is hemmed round the little stays. A small pleat is laid at the corners to make it fit well. It is a good plan to *fold* the binding quite evenly down the middle, and then to lay the crease along the edge. It needs careful tacking round the under-arm curves. Practice in the



Doll's Stays (3½″ × 11″).



Doll's Stays, showing Quilting partly Done.

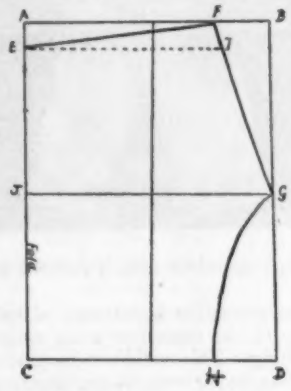
setting-on of tapes is afforded by the shoulder-strap and the loops, which can be used instead of button-holes. Six buttons are sewn on—three to fasten the garment, and three to support the drawers.

Doll's Drawers.

Oblong of paper, 6″ by 9″.

To fit any Size of Doll.—Measure the length from the waist to as far below the knee as is desired over the back hip, to allow plenty of room for sitting down if the doll is a jointed one. The width is once and a half the length.

As this is the method by which drawers are measured for children, there is nothing to unlearn.



Doll's Drawers (6″ by 9″. 4½″).

Double the paper, so that it is 6″ by 4½″. Open it as in diagram, with the fold coming to the left hand. Double it once in each direction.

Mark the corners A, B, C, D.
From A mark E ⅛ of a division down.
From B mark F ½ in.
Join E to F by a straight line.
From B mark G 1 down.
Join F and G by a straight line.
From D mark H ½ in.

Draw a curve from G to H.

From E dot a straight line till it meets the line F G. Name that point "I."

From A mark J 1 down.

Cut from E to J for the side opening.

Cut carefully round the outline, but *not* the line E I, which must be *creased* only. Then turn the paper round and cut along the crease, which makes the front so much shorter than the back.

Making up the Drawers.—Join the legs by any suitable method. Commence *tacking* at the knee, and snip off any irregularity at the seat. Join the front and back together, making the leg seams meet.

Make a narrow hem round the side openings, which can be further strengthened by narrow tape if thought desirable.

It will be found a suitable exercise for Standard III., after which the girls could be encouraged to bring their pinafores to be strengthened in the same way under the arms, where they so often slit open. A glance at the number of torn pinafores in a class will reveal the necessity and usefulness of such precautionary measures, and will prove an effective illustration of the time-worn adage, "Prevention is better than cure."

Lay a fold, on the right side, at the bottom of the leg.

Join the lace or embroidery to be used for trimming, allowing about half as much again as fullness.

Lay the embroidery over the raw edge, pinning the join to the join and the half to the leg half. Tack them together, arranging the fullness evenly.

Lay a fold, *on the right side*, at the bottom of each leg, and tack it down ready for the frill.

Frills.—Each is 14″ by 1¾″. Join by the same method as is used on the other part of the garment.

Make a tiny hem along the bottom.

Join the lace, making it exactly the same length as the frill.

Lay the edge of the lace over the hem of the frill, placing join to join, and run the two together.

Mark the half and quarters of the frill.

Lay tiny pleats along the top edge of the frill.

Place the join to the inside leg seam; the half to the outside join, and the quarters to the middle of back and front.

Tack the frill over the raw edge at the bottom of the leg.

Join the insertion, making it exactly the same size as the leg. Placing the join to the leg seam, let the lower edge of the insertion come to the edge of the leg, having the frill between the two. Run it along both edges.

The raw edge of both neck and sleeves is turned down on the *right side*. The lace edging is tacked over it, and the insertion laid over the two. It will require a few shallow pleats to make it fit round the shoulders before it is run at each edge. The join in both lace and insertion round the sleeves must come to the under-arm seam.

Baby ribbon threaded through the insertion adds a

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pretty touch of colour to the garment, and forms the fastening.

Join a strip of feather galloon or insertion, which should be the same width at the leg. Tack it over the raw edges, and hem or run each edge neatly.

Bands.—Both back and front bands are 6½″ by 2½″. Turn in the edges all round and seam the ends. *Press* it well to keep the folds in place. Pin the middle to the join, and make the ends fit the side openings *exactly*. Tack the right side down and hem it. Tack the wrong side and hem it.

Button-holes worked by an older girl were made on the model; but tape looms will answer the purpose equally well, and will give extra practice in that valuable exercise. (*To be continued.*)

MODERN SCIENCE NOTES.

BY J. G. M°INTOSH, B.SC., SECONDARY SCHOOL, GATESHEAD.

MAGNETIC MEASUREMENTS: THE LAW OF INVERSE SQUARES.

IN making magnetic measurements the chief aims of the physics master should be simplicity in apparatus and reasonable accuracy in quantitative results. The following method of testing the truth of the law of inverse squares has been found to give good results, and, in addition, to provide an interesting exercise on the derivation of an empirical formula by graphic methods.

The essential point in the experiment lies in the elimination of the earth's field by means of a compensating magnet and the consequent simplification of the calculations involved. In addition to this, the whole of the apparatus used was made in the workshop, with the exception of the permanent magnet, A (Fig. 1).

The magnetometer, M, consisted of a small piece of magnetised steel spring about ½ inch long, and fixed to a mica vane rectangular in shape, 1 inch long and ¾ inch deep. On the front of this is fixed a small circular plane mirror, the vibrations of the needle being counted by the flashes of a reflected light across the ends of a horizontal cardboard tube, which is used as a primitive type of telescope. The whole is suspended by unspun silk, and enclosed in a cylindrical lamp glass. This was fixed into a wooden base turned in the workshop, and a turned top placed on it, from the centre of which the needle is suspended.

The method of performing the experiment is as follows. A magnetic meridian, NS, is marked off on an imperial sheet of drawing-paper, fastened to the bench. The diameter of the base of the magnetometer is obtained, and a circle described with this diameter (see Fig. 2). If the needle of the magnetometer has been carefully centred and the instrument levelled, the centre of this circle represents the plan of the centre of the magnetometer needle. From the point M distances 5 cm. long are marked off along the meridian in a southerly direction. The magnetometer is then adjusted, and the permanent magnet, A, placed along the meridian with its N pole pointing south, in such a position that the magnetometer needle lies east and west. The earth's field is then compensated, and its future effect is negligible.

For the purposes of the experiment the pupil is assumed to know that the flux density at any point is proportional to the square of the vibrations of the

FIG. 1.

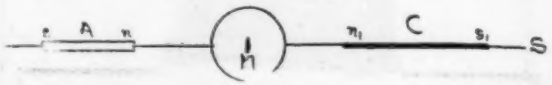

FIG. 2.

needle per unit of time. In my own course this is experimentally ascertained previously.

A long knitting-needle, C (about 50 cm. long), is then magnetised by placing it inside a solenoid, and its north-seeking pole, N, adjusted at a distance, d, from the needle.

With a needle of this description the effect of the south-seeking pole, s_1, has been found to be negligible. To all intent the magnetometer needle is situated at a point where the field intensity is due to n_1 alone. It should be noted that the wooden stands upon which the permanent magnet A and the needle C rest are arranged so that they are in a line with the magnetometer needle.

The number of vibrations in the unit of time is obtained at this distance, and the experiments repeated until some eight or ten results have been obtained.

The graph of the number of vibrations squared, and the distance in each case, is plotted, and the result suggests that the curve is of the family $y = ax^{-n}$.

This suggests plotting $\log y$ and $\log x$, and the values of a and $-n$ are found empirically.

The experiment gives good, reliable results, the average value of n for a class of ten separate experiments being 2·001, a result sufficiently convincing to most students. I append a series of results taken from an actual experiment.

The method is capable of development. If C be replaced by a solenoid, the relation between the intensity of the field at a given point and the amperage through the solenoid may also be determined graphically. Lengths of soft iron wire may then be inserted in the solenoid, and

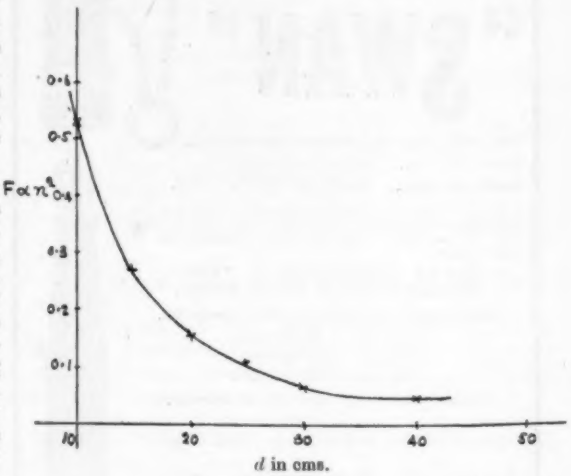

FIG. 3.

the curve of magnetisation of the iron deduced by subtracting the ordinates for the solenoid from those due to the compound effect of iron and solenoid.

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Results :—

n^2aF	0·049	0·0702	0·1087	0·156	0·269	0·5369
d	40 cm.	30 cm.	25 cm.	20 cm.	15 cm.	10 cm.

Logarising, and taking F to lie between 49 and 537,

log F	1·6902	1·8463	2·0363	2·1931	2·4298	2·7298
log d	1·6021	1·4771	1·3979	1·3010	1·1761	1·0000

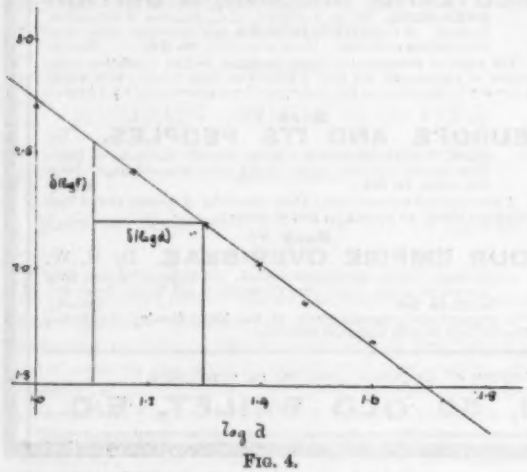

FIG. 4.

This latter graph is of the form

$$\log F = \log C + n \cdot \log d.$$

where n and c are constants.

From the graph $2{\cdot}585 = \log c + 1{\cdot}1\ n.$

$$2{\cdot}2 = \log c + 1{\cdot}3\ n.$$

$$\therefore -{\cdot}2n = {\cdot}385,$$

$$\therefore n = 1{\cdot}925,$$

$$\text{and } \log c = 2{\cdot}585 - (1{\cdot}1 \times 1{\cdot}925),$$

$$= 2{\cdot}585 - 2{\cdot}118$$

$$= {\cdot}467.$$

$$\therefore c = 2{\cdot}93.$$

Hence $$F = \frac{2{\cdot}93}{d^{1{\cdot}925}},$$

or $$F \propto \frac{1}{d^2}.$$

Instead of plotting the two graphs separately, the results may be plotted directly upon logarithmic paper.

The Cult of the Horse Shoe.

Most people, especially those in the north country, know the common superstition that the horse shoe above the door is supposed to bring luck to the inhabitants. Should you feel inclined to supplicate the favours of the gods in this fashion, remember to put it up with the open end pointing heavenwards, else your luck will all run out. In the *Oxford and Cambridge Review*, Dr. A. S. Palmer has devoted some time to the study of this superstition. He arrives at the conclusion that it is derived from the cult of the new moon, which was adopted by primitive races as the symbol of good fortune. He has also collected some curious examples from the prehistoric records of Europe, showing that the symbol was regarded as being endowed with magical power. He further points out that the rising moon lying on her back was supposed to be a silver boat, and from this concludes that the proper method to fix your horse shoe, whether on motor or back door, is with the heels upwards.

A Noiseless Typewriter.

Readers of the new feature in this month's *Practical Teacher* may be interested in the invention of a noiseless typewriter. In the usual type of machine the type bars are arranged in what is known as a "basket." From this normal position a bar is lifted, when a key is depressed and swung upward with increasing velocity until it strikes the paper when at its maximum speed. In the new machine this principle is departed from entirely. By a kind of toggle action the type is moved at high speed to the printing position, but before it reaches this point its velocity is diminished, with the result that the type operates by pressure alone—the whole process occupying the same amount of time as in the ordinary machine.

The type bar is prevented from moving beyond the printing point by the roller, which travels in a cam slot moving idly down the slot into a hinged link.

In order to produce a clean-cut impression a flat steel platen is used. The paper is carried and fed to the printing position on a soft rubber roll. When it reaches this position it passes over a steel bar, which thus provides it with an inflexible backing.

At the front of the machine there is a dial with pointer. By turning this pointer one way or the other the carriage may be moved bodily towards or from the printing point. This adjustment serves to regulate the depth of the impression, so that the machine may thus be adapted to manifolding.

The escapement, shift, and back spacer movements have been rendered silent by an ingenious arrangement of ratchet pawls and dogs fitted with cam surfaces, so that there is no clicking noise whatever.

Mechanical Hysteresis of Rubber.

This formed the subject-matter of a paper read before the British Association by Mr. A. Schwartz. To those teachers who are fond of introducing mechanical analogies into the other branches of physics the experimental method may be useful. The principle is indicated in the diagram on the next page.

The strip of rubber to be tested, usually measuring $\frac{3}{4}'' \times \frac{1}{8}'' \times 4''$ long, is connected by a flexible cord passing round a pulley, with a spring balance as indicated. The upper ends of both the rubber test piece and the spring are connected, the one to a drum and the other to the pencil of a recording gear. The load is applied to the specimen by pulling down the pulley, and as will be seen from the arrangement of the apparatus, the pull on the test piece and on the spring are equal, although the corresponding extensions are different. The diagram obtained in a cycle comprising the gradual loading of the specimen and the gradual removal of the load has the character indicated in the diagram. On repeating the cycle the area of the hysteresis loop increases, the maximum extension under the same maximum load being greater. With high-grade rubber the area of the hysteresis diagram becomes

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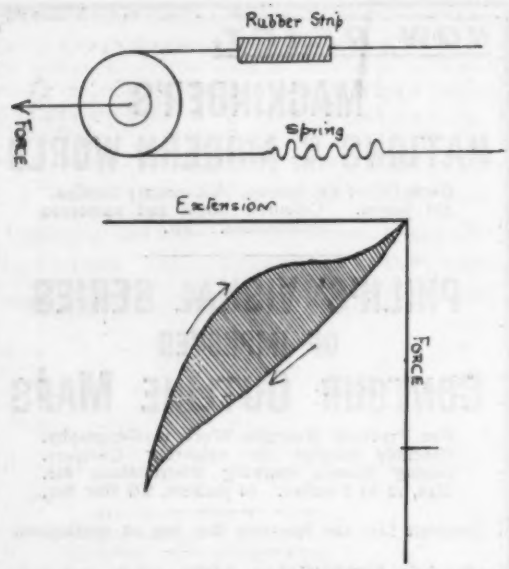

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WORTH THE COST.

How Finchley Education Committee Justifies its Expenditure.

THE Finchley Education Committee recently organised an exhibition of school work, so that the parents of children and the ratepayers of Finchley might have an opportunity of seeing for themselves how the children in the Finchley Elementary Schools are taught, from the lowest class in the infants' department to the highest class of the seniors.

In order that all the people of Finchley might see what was going on, it was arranged that the same exhibition should be held at four different centres of the parish on four successive nights, and here no small effort of organisation was required in order to ensure success. The exhibits were all mounted and pinned to collapsible trays, which at the conclusion of each day's exhibition were closed and carried to the next centre, and exhibited to the best advantage by a small army of willing helpers.

In the first place, the exhibition was not intended to show the best work of the children, but was arranged to show the development of each subject; this desirable end, together with the correlation of subjects, was achieved by the arrangement of the rooms.

The following is the order of the rooms:—

Room 1.—Infants' handwork (including collective work, paper folding, clay modelling, paper cutting, cane weaving, bast weaving, the making of common objects, etc.).

Room 2.—Junior handwork for boys and girls (paper work, cardboard modelling, and clay modelling).

Room 3.—Senior boys' handwork (wood and metal work).

Room 4.—Senior girls' handwork (needlework, cooking and laundry, paper-flower making).

Room 5.—How children are taught to write.

Room 6.—How children are taught to draw.

Room 7.—How children are taught numbers.

Room 8.—How children are taught essay writing.

Room 9.—How children are taught geography, gardening, and Nature study.

Room 10.—Recreative subjects, hobbies, etc.

The Central Hall was filled from floor to ceiling with exhibits from the various schools—brush, pencil, crayon work, etc.—but a close examination of each paper failed to discover the name of the school supplying the exhibit or the name of the child who did the work. Only an initial and the age of the child were given, and on inquiring why this was so, we were informed that it was not the desire of the committee to create jealousy between schools, but to encourage the teachers to gain fresh ideas by seeing the work of other schools.

With regard to the exhibits shown, the general verdict of the visitors was that they were well worth seeing, and gave one the impression that we had not yet reached the limit of a child's capabilities. If such work had been shown ten years ago, it would have been pronounced "a miracle."

In Room 1, where infants' handwork was being shown, great interest was taken by the visitors in some models of dolls' houses, made and furnished by the little children out of match-boxes; and the cane weaving and bast weaving also caused a good deal of admiration. Collective work is not only a fine medium for inculcating the value of co-operation, but must be a most valuable means of encouraging free conversation and connected speech in the little ones; thus will the artificial methods of old infant schools disappear and the natural methods of the nursery replace them.

In Room 2, besides an exhibition of work done by the children, a class in cardboard modelling was being taken by a teacher, and it was most interesting to watch the eager interest of the children in their work, and to notice their pleasure as their model was being made by their very own hands.

Again, in Room 3, a class in woodwork was being taken, and some very excellent work was being turned out. In this room a good deal of praise was given to a number of models of original design made by the boys, which showed that the handwork training had been of the correct kind, in that it had promoted self-initiative.

In Room 4 the needlework and cooking exhibits came in for a good deal of admiration, and a class in needlework was visited by many of the parents, especially the mothers.

In Room 5 the process by which a child is taught to write was very clearly shown. Three specimens were taken from each class—from the lowest division of the infants' department, where very large letters are made, to the highest class in the senior department. Three specimens were shown from each class, and were labelled "Good," "Medium," and "Poor," and the improvement in the writing in each class was most marked.

Room 6 had some excellent crayon and brush drawing, and in this room was shown how the children model their own fruits and leaves and flowers themselves.

Room 7 was interesting to educationists, as here the development of reasoning was shown in a very marked manner. A set of questions suitable to each class was given, and underneath were specimens of the sums correctly worked, each paper showing that the logical result had been attained only by a process of reasoning on the part of the child.

In Room 8 the development of the art of writing good composition was shown, and here in the infants' department a complete essay might be seen written by a child of six. Then the development was to be traced to the top class, from which an essay in very good English, taking up twelve foolscap sheets of paper, was shown as an exhibit.

Room 9 was devoted to geography, etc., and here was shown the life of children in other lands by means of models of an Eskimo hut, an Indian village, a Japanese village, etc. Then the development of geography was traced through the homeland to regional and statistical geography, and here we saw some beautiful specimens of relief maps made from paper pulp and coloured by brushwork. In the Nature study exhibits a large number of books of pressed leaves were shown, and many of them were very tastefully and beautifully arranged.

The gardening exhibits showed how this subject could be correlated with geography, drawing, Nature study, arithmetic, etc.

Room 10 was used to display the work done by children at home as hobbies; and in this room there were many items, too numerous to mention, from the scientific toy made by combining the science and manual training lessons to the boots and shoes soled and heeled by the children. The Finchley Education Committee believe in encouraging the children in their hobbies, and give them every help in their selection.

The exhibition—which was held at Long Lane Council School, East Finchley, on the Tuesday; Albert Street Council School, North Finchley, on the Wednesday; and St. Mary's Church End, Finchley, on the Thursday—was brought to a conclusion at Squire's Lane Council School on the Friday, when the various cups, shields, medals, banners, etc., which had been won by the various schools at swimming, physical drill, life saving, etc., were presented to the successful schools.

In conclusion, we might mention that the exhibition was visited by thousands of parents during the few days that it was open, and the general verdict was that they were more than satisfied that their children were receiving at the hands of the Finchley teachers a good sound and liberal education.

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There could be no more welcome gift-book to a boy or girl with a bowing acquaintance with French than this volume of the old favourite, *Mon Journal*. Its contents follow the usual lines—comprising serial stories, short stories, anecdotes serious and humorous, *découpages*, home games and conjuring tricks, construction of toys, needlework exercises, easy cooking recipes, some simple and charming music, and a residue less easy to classify—all illustrated with drawings, many of which are of high merit. The serial—"Cinq Semaines en Aéroplane"—will be a special favourite. The book is admirably suited for enticing young people to improve their command of French.

Lectures pour Tous: Revue Universelle et Populaire Illustrée. (Douzième Année, 1909–1910.)

This popular monthly, now in its thirteenth year, lives well up to its reputation. It certainly contains reading matter suited to every taste and to all ages, dealing with subjects of present interest, and lavishly illustrated. The contents defy classification, and space will not permit enumeration. Considerable space is given to Roosevelt's hunting tour in Uganda; and there are also several interesting articles on the modern sport—if it is a sport—of aviation. The articles on artists and their works also strike one as being worthy of special mention. Contemporary history and recent travel, popular science, "féminisme" (quoted because untranslatable), and every subject of interest find a place in this charming volume.

Les Fauves d'Afrique Photographiés chez Eux, d'après cinquante-huit clichés de l'Auteur; par A. Radclyffe Dugmore.

This handsome volume is a splendid example of the "new hunting"—that in which the hunter bags his game with the camera instead of the rifle. The rifle is indeed not quite obsolete, for on several occasions, as we read, the author's determination to secure his snap-shot at close quarters led to the necessity of a companion following it up with the more commonplace snap-shot with a rifle, in order that both the photograph and the photographer might be saved from the charge of an ill-tempered rhinoceros. Amateur photography has long been recognised as the "gentle art of making enemies" among one's friends, and its results seem to be not dissimilar among the wild animals of East Africa. (It is doubtless the intelligent compositor who has placed these events in *Algiers* instead of on the banks of the *Olgerei*.) The author, an American, chose for his field of operations British East Africa, the reserve of which seems to be simply swarming with big game, and his word pictures, no less than his magnificent photographs, are of the utmost value in presenting a picture of the upland regions near Nairobi. The photographs of zebras, antelopes, and giraffes, together with those of the lion, the hyena, the rhinoceros, the hippopotamus, and the buffalo, form a marvellous store of "nature knowledge" in themselves. Any boy, or for that matter any teacher, who can read French (the style of which, by the way, does not strike us as being of equal excellence with the other aspects of the book) will find this volume treasure trove. There is the substance of many excellent geography lessons therein. *Verb. sap.!*

Voyages et Chasses en Ouganda: ouvrage illustré de 45 gravures tirées hors texte et d'un carte; par B^on de Langsdorff.

We have rarely, if ever, read more realistic and detailed descriptions of this part of Africa—the voyage up the Nile from Khartum to Gondokoro, and the march thence to Entebbe. The author has an unusual power of graphic description, and makes the scenes vivid and "convincing." In his hunting exploits the picture becomes almost too realistic for pleasure, and smells somewhat of the abattoir, though the writer is by no means one of the bloodthirsty school of Nimrods. As an aid to our empire geography the book is valuable, and the sketches of our administrators in outlying parts are sympathetic and appreciative. The photographs are good, but suffer from excessive reduction.

Petit Poète et Grand Roi; par Charles Géniaux; 45 illustrations par Vogel.

This is one of the handsome and spacious prize books which Messrs. Hachette send forth as regularly as Christmas appears on the horizon. The contents of the book are worthy of its sumptuous exterior. The story is a good one, and well told—the story of a lad who by reason of the real genius within him proved an insoluble problem for teachers and friends alike, with the exception of one good Jesuit father, who was ready to condone all failings for the sake of his talent for poetry and the drama. How the hero runs away from home with a *fidus Achates* and joins fortune with a moribund troupe of strolling players, and how he was after its dissolution befriended by one of the true brotherhood until his fortune was made by the approval of the great Louis XIV.—these things give scope for admirable pictures of the golden age of France, in which we are introduced to Boileau, Molière, Racine, and La Fontaine, together with other picturesque types, not to mention the "Grand Monarque" himself. It is a capital book for a boy or girl who is mildly interested in things French.

Trois Mauvais Diables: par M^lle G. du Planty. Ouvrage illustré de 46 gravures par E. Zier.

Deux Papillons: par M^me Chéron de la Bruyère. Ouvrage illustré de 38 vignettes sur bois par Tofani.

These two new volumes of the "Bibliothèque Rose Illustrée" carry out excellently the idea of the series; they are pleasant and attractive tales of juvenile life, with an entirely healthy moral tone. In fact the only criticism which could be made would be that occasionally the moral tone is somewhat too pronounced, and the young people talk in a strain which we might regard as somewhat priggish; but in these matters national differences must be allowed for. Neither the *Mauvais Diables* nor the *Papillons* are to be understood literally; the first are, naturally, boys, whose claim to the title is not absolutely beyond question, though they are undoubtedly of a type little appreciated by teachers. Yet they "tak' a thocht an' mend," as Burns once hoped their name-father might do, and the story ends well. In this, and more particularly in the second story, the pictures of French domestic life are extremely interesting for English boys and girls.

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EXTRACTS FROM PRESS NOTICES.

The Athenæum (October 22, 1910) says:—"This modest-looking but really encyclopædic-manual of town-lore topics, historical and actual .....Of the chapters dealing seriatim with all the communal businesses and belongings of a modern city, from scavenging to schools of art, it would be difficult to speak too highly. The analysis is exhaustive, the statement lucid and concise, and the personal tone of the whole curiously wise and right."

The Manchester Guardian (September 27, 1910) says:—"We hope that many teachers whose work lies among the children of the higher classes in our elementary schools will obtain and make use of 'Town Study,' by Miss M. M. Penstone. Apart from those pages which deal with the technique of teaching, the volume is an excellent introduction to the study of local and central government for the ordinary citizen."

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